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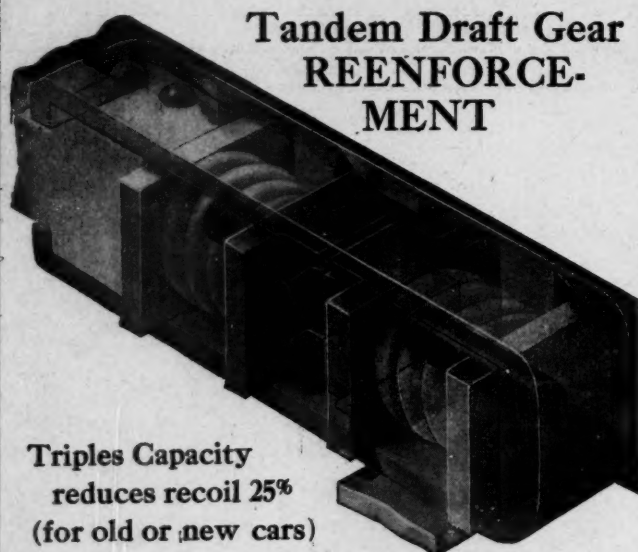
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*Illustrated.

More and more interest is being taken by railway officers generally in studying how best to select men for certain jobs, or for promotion. A word of caution

Scientific Selection of Men

is needed. There is no royal road to the accomplishment of this task, despite the statements and writings of a certain class of psychologists, or alluring magazine advertisements. There is a simple, practical means for encouraging supervising officers to study and analyze their subordinates to which attention has been called repeatedly in our columns (*Railway Age Gazette*, August 6, 1915, page 232); it is slow, but sure, and requires patience and a firm purpose on the part of those in charge to put it through. Reliable investigations at the University of Cincinnati have demonstrated the fallacy of placing reliance on phrenology or the claims that physical characteristics indicate certain abilities. Applied experimental psychology is in its infancy and as Dean Herman Schneider has said in reference to its use for selecting men, it "seems to be at the point where chemistry was when it was alchemy." It is well to use science in selecting men, but let it be the science of hard work in making a thorough and critical study of each individual while he is actually working on a job. On the basis of this study encourage and help him to strengthen his weak points, so that he will develop and fit himself for a bigger job. If he fails, the reasons for failure should suggest the sort of work to which he can be transferred with good results.

The conferences between the National Conference Committee of the Railways and committees of the train-service brother-

Arbitration or a Strike

hoods will be resumed in New York next Tuesday. They will probably be short. The railways committee will renew its offer to (1) submit the proposals of both sides to the Interstate Commerce Commission, or (2) submit them to arbitration under the Newlands act. It seems probable that the committees of the employees will suggest some counter plan with the expectation that the railways will reject it and thereby put themselves in the position of declining a means of peaceful settlement. For example, they may repeat the trick played by them two years ago, of agreeing to arbitrate, provided only the demands of the employees are arbitrated; or they may

suggest the creation of a board so constituted that, from the railway point of view, it would be utterly objectionable. One thing seems certain, however. This is, that the railways will not concede any more than they already have offered. They are willing to arbitrate, but they will not consent to arbitration by some one-sided board, and they will not consent to arbitration which does not include consideration of their demands as well as those of the employees. If the alternative is further concessions on the part of the railways or a strike, then the strike should be allowed to come. There will never be a better time for settling whether or not the railway labor brotherhoods can dictate their own terms to the railways and defy the opinion of the public and trample on its rights.

As announced in the financial news columns of the *Railway Age Gazette* last week, the committee representing the Central Branch Railway first mortgage

A Unique Reorganization

bonds of the Missouri Pacific has succeeded in having the reorganization plan, which was formulated by Kuhn, Loeb & Co., changed so as to provide for the exchange of these bonds for new general mortgage bonds, par for par, instead of 50 per cent in new general mortgage bonds and 50 per cent in new preferred stock. Two other committees representing comparatively small issues of bonds have also succeeded in having the plan modified so as to give them somewhat more favorable terms than they would have had under the original plan. The fact that these concessions have been made is strong evidence that justice was on the side of these committees representing small bond issues. The Missouri Pacific reorganization has gone forward with extraordinary swiftness. The whole affair is unique in American railroad history. For years George Gould had been losing his grip on the Missouri Pacific and Kuhn, Loeb & Co. had been playing a more and more important part in the dictation of the policy of the management. When the bankers were at last completely successful in eliminating Gould control, a reorganization plan was put forth calling on securityholders to submit voluntarily without receivership to the provisions of this plan. The conflicting interests, however, were too varied and the steam roller of receivership was considered a necessity. The road was placed in the hands of its own president, B. F.

Bush, as receiver on August 17, 1915. Committees were formed by interests opposed to some of the provisions of the reorganization plan. Conferences were at once begun by these committees with Kuhn, Loeb & Co. looking toward an adjustment of differences, and now, in a little less than a year after the appointment of the receiver, the reorganization plan has been declared effective and consents to it are rapidly coming in. If a readjustment of a railroad company's financial structure is a necessity, and no one doubted that in the case of the Missouri Pacific it was a necessity, such expedition as has been shown in working out the financial plans of the Missouri Pacific is, if it is done thoroughly and fairly, as well as quickly, in the interests of the organization of the road, its securityholders and the future development of the property.

AND SO THE BROTHERHOODS ARE MERELY BLUFFING!

RAILWAY officers and other persons who have followed the wage controversy between the railways and the train employees have felt some apprehension lest there should be a strike. This apprehension has been due to the facts that some of the leaders of the employees have said that they will not arbitrate, and that a strike vote actually is being taken. Now, however, Chairman Adamson of the House Committee on Interstate and Foreign Commerce, has made an oracular statement indicating either that certain leaders in Congress have allowed themselves to be duped, or that the leaders of the labor brotherhoods are merely bluffing.

Recently a bill providing for an investigation of the general subject of railway regulation was before the House. Chairman Adamson, who was in charge of the bill, was asked if the wage controversy was included within its scope. He replied that it was not, and gave the following explanation: "Four months ago when the clouds gathered above the horizon the Republican leader [James R. Mann] and I investigated to see whether there would be a strike. I will not say where we went, but we were assured by the representatives of the employees that there would be no walkout and they did not mean to stop the wheels. The Interstate Commerce Commission did not favor an investigation and I concluded that no action was necessary and dropped the subject." This shows that one or the other of two things is true. Perhaps Chairman Adamson and Mr. Mann allowed themselves to be misled by ambiguous or disingenuous statements on the part of the representatives of the employees. Either this, or the leaders of the brotherhoods, while saying loudly that they are unalterably opposed to arbitration and taking a strike vote, are merely bluffing. In either event, the course for the railways to take is clear. They ought to continue to refuse to concede the employees anything without previous arbitration. Any railway officer who would suggest making any concession whatever, except after arbitration, ought to be branded as a coward, and as a traitor to the interests of the railways and the country. If the leaders of the brotherhoods should then call a strike some eminent gentlemen in Congress will be greatly embarrassed, and there may be a dispute as to what actually was said at their conference with the representatives of the employees. For their future protection we suggest that they get an agreement in writing with the leaders of the employees as to what really passed between them.

Meantime, this statement of Mr. Adamson that the leaders of the employees assured him and Mr. Mann, in effect, that they are merely bluffing will be most gratifying to the managers of the railways. They intended to call the brotherhoods' bluff, anyway; and it will be very comforting to them to know, on the assurance of such an eminent public man as Mr. Adamson, that when this is done the brotherhoods will more or less promptly and gracefully back down.

DECLINE OF RAILWAY DIVIDENDS IN 1915

WHILE many people are talking about the remarkably large current earnings of the railways, the statistics of the Interstate Commerce Commission for the fiscal year ended on June 30, 1915, which have just been issued, have disclosed some striking facts illustrating the extent to which the railway business was depressed before the phenomenal increases of earnings began. They show that in the fiscal year 1915 the percentage of railway stock on which dividends were declared was the smallest since 1904, and that the average rate declared on all stock was the smallest since 1905. The total stock in existence necessarily increases from year to year as a result of the raising of funds for improvements and extensions. Nevertheless, the absolute amount of stock on which dividends was paid was smaller in 1915 than in any year since 1909.

The stock on which any dividends were paid was only 60.45 per cent of the total. In other words, no dividends at all were paid on 39.55 of it. The average rate paid on all stock was but 3.8 per cent. The following table gives the amount of stock on which dividends were declared, the amount of dividends declared, the percentage of all stock on which dividends were paid and the average rate paid on all stock for the years 1905 to 1915, inclusive:

	Amount of stock paying dividends	Amount of dividends paid	Per cent of stock paying dividends	Average rate on all stock
1915.....	\$5,219,846,562	\$328,477,938	60.45	3.80
1914.....	5,667,072,956	451,653,346*	64.39	5.13
1913.....	5,780,982,416	369,077,546	66.14	4.22
1912.....	5,581,289,249	400,315,313	64.73	4.64
1911.....	5,730,250,326	460,195,376	67.65	5.43
1910.....	5,412,578,457	405,771,416	66.71	5.00
1909.....	4,920,174,118	321,071,626	64.01	4.18
1908.....	4,843,370,740	390,695,351	65.69	5.30
1907.....	4,948,756,203	308,088,627	67.27	4.19
1906.....	4,526,958,760	272,795,974	66.54	4.01
1905.....	4,119,086,714	237,964,482	62.84	3.63

*Includes extraordinary dividends of the Union Pacific and Central Pacific of over \$86,000,000 greater than the dividends of those companies for the preceding year.

It will be noted that the largest amount of dividends ever declared was in 1911, and that the next largest amount was in 1914. The amount in 1914, however, was swelled by large extra dividends declared by the Union Pacific and the Central Pacific in connection with the dissolution by the courts of the Harriman system. Except for the large extra dividends of these roads, the total dividends declared would have shown a steady decline from 1911 onward.

It should be noted that the figures given here are not those for dividends paid on stock actually "outstanding in the hands of the public." As is well known, a large part of the stock of railway companies is owned by other railway companies, and in consequence a large part of the dividends declared are paid by some railways to other railways, and then again paid out to their stockholders as dividends on their stock. Consequently, the amount of dividends declared exceeds the amount finally paid on the stock outstanding in the hands of the public. In 1914, for example, the total amount of dividends declared was \$451,653,346, while the net dividends finally paid on stock actually in the hands of the public amounted to only \$339,768,533. But the total amount of dividends declared is highly important and significant, for all the dividends finally paid on stock in the hands of the public must come out of the gross amount originally declared.

The reduction in the amount of stock paying dividends and the amount of dividends paid in 1915 was due to the decline in the net operating income of the railways in 1914 and 1915. This was due chiefly to increases in operating expenses and taxes. The increases in operating expenses were due chiefly to advances in the wages of labor; and it may be said truly that the entire reduction in net operating income and in dividends, and the fact that many roads be-

came unable even to pay their interest, were attributable to increases in wages and taxes.

It is especially important that the public should be reminded of these facts at this time. The railways are now enjoying a large increase in earnings. But they had large increases in earnings before, as in 1910 and 1913, for example, and these were accompanied, or immediately followed, by so much larger increases in wages and taxes that the general tendency of net return and of dividends was downward. Even though the present earnings should be maintained it would be easy to soon more than offset them if wages and taxes should be advanced as rapidly in proportion as they have been in past years.

The Interstate Commerce Commission recently has received criticism from uninformed or unfair persons because it permitted increases in rates in 1915. It has been said that the earnings of recent months have shown that these were not needed. But the commission was confronted with the figures for 1914 and part of the figures for 1915, and the final figures for 1915 show that if it had refused to permit any increases in rates it would have ignored facts which should have exerted a controlling influence on its judgment. Furthermore, the statistics for past years show that in spite of the present large earnings the commission unquestionably will have to grant further increases in rates if the upward tendency of wages and taxes is maintained.

Neither the results of the best years nor the results of the worst years should determine the policy of the public in dealing with the railways. It should be determined by the great, dominating tendencies in the industry, and these can be ascertained only by studying results for a period of years. If the policy of the public in dealing with the railways is based not on the results of any one year, but on the results of the last ten years, the way in which wages and taxes and the regulation of rates recently have been dealt with will be greatly modified.

THE HEADLIGHT QUESTION

IT seems probable that the recent order of the Interstate Commerce Commission regarding headlights will be attacked in the courts by some of the eastern roads having a dense traffic handled on multiple tracks under block signal protection. The order of the Commission, which was issued in June, requires that each locomotive "shall have a headlight which will enable persons with normal vision in the cab of the locomotive under normal weather conditions to see a dark object the size of a man for a distance of 1,000 ft. or more ahead of the locomotive." (See *Daily Railway Age Gazette*, June 16, page 1358, for the complete order.)

The petition for the commission to regulate headlights came from the railway labor brotherhoods. The order sought by them was opposed by the representatives of the railways. It is a circumstance both remarkable and significant that the requirement finally made is that which the Brotherhood of Locomotive Engineers decided at a convention held in May, 1915, to seek, and that even the verbiage of the order is almost the same as that used in the resolution adopted by the brotherhood. The Commission has been charged ever since it was organized with being subservient to the railway labor unions. Its handling of the headlight question will not improve its reputation in this respect. A committee of the American Railway Master Mechanics' Association somewhat over a year ago made exhaustive tests of high-power headlights. This committee was composed of mechanical officers of the Pennsylvania Lines West, the New York Central, the Louisville & Nashville, the Chicago & North Western, the Chicago, Burlington & Quincy, the Baltimore & Ohio and the Boston & Maine. High-power headlights are used on some of these roads but not on others. The committee, nevertheless, reported against their use on mul-

tiple track lines handling a dense traffic, and the Master Mechanics' Association accepted its report. The Interstate Commerce Commission seems to have completely ignored the action of the Master Mechanics' Association.

A large part of the railways of the United States have shown their belief in high-power headlights by voluntarily buying and using them, but it does not follow because many railways have done this that their use everywhere should be required. The physical and operating conditions on our railways vary enormously. There is no similarity between the conditions on a single track light-traffic line in a desert in Nevada or Arizona and those on a four or a six track line in New York or Pennsylvania handling a traffic perhaps 30 or 40 times as dense. Because of these differences in conditions a requirement for headlights applying uniformly throughout the country is absurd on its face. In the second place, the phraseology of the Commission's order is wholly indefinite. What is "normal vision"? What are "normal weather conditions"? What is "a dark object"? A man in a black suit is obviously "a dark object the size of a man." Plainly also, a man in a white suit is not. But how about a man in a gray suit? Are weather conditions normal both when there is bright moonlight and when there is no moonlight? When it has been determined, if it ever shall be, what are "normal vision," "normal weather conditions" and "a dark object the size of a man" it will still be a question as to exactly what kind of a headlight will meet the requirement.

Probably the Interstate Commerce Commission ought to adopt some form of regulation for headlights, but its requirements ought to recognize varying conditions, they ought to be clear and definite, and they ought not to ignore the results of the investigations of the leading railway mechanical experts of the country. The Commission in dealing with questions of safety will always have to rely, to a considerable extent, on the judgment of its subordinate boards, and it is extremely unfortunate that its boards which have to do with such matters have been constituted so largely of men whose point of view is that of the railway labor brotherhoods. The point of view of the labor brotherhood is not necessarily either that of the mechanical expert or that of the public.

"INVOLUNTARY SERVITUDE"

THE reason why the spokesmen of the railway labor brotherhoods are opposed to arbitration is that they fear that it would reduce their followers to "involuntary servitude." This is disclosed by an article in the July number of the *Locomotive Firemen and Enginemen's Magazine*. The *Railway Age Gazette* said in an editorial in a recent issue that the train service brotherhoods, by supporting their demands for higher wages by a nation-wide movement, had raised a question for the officials of the nation to settle, and indicated that they should settle it by forcing the controversy to some form of arbitration. This suggestion makes the *Locomotive Firemen and Enginemen's Magazine* anticipate the early restoration of human slavery on this continent. In its July issue it heats itself up greatly and gives forth the following blast of rodomontade—otherwise more vulgarly known as "guff".

The duties of the officials of the government at Washington are clearly specified by the Constitution of the United States and nowhere in the Constitution is it defined as either a duty, prerogative or privilege of any public official or body of officials no matter what their station or power, to establish, enforce or maintain involuntary servitude, particularly in the interest of private privileged profit takers, but on the contrary such an act would be a gross violation of the Constitution and should it be attempted those undertaking it will be brought to vividly realize that the lesson of 1776 has not been taught in vain.

If certain of the leaders and spokesmen of the labor brotherhoods would devote their voices and pens less to this sort of rant and cant, and more to the discussion of the questions really involved in the present wage controversy,

they would serve their followers quite as well and do less to earn for themselves the reputation of mere ear-splitting blatherskites. The remarks of the Firemen and Enginemen's Magazine are directed entirely to the comments of the *Railway Age Gazette* on the need for action by the government in regard to railway labor controversies. Therefore, it is the province of the *Railway Age Gazette* to answer it; and in doing so it should be understood that, as is always the case, it expresses nobody's views but its own.

Be it known, then, that the *Railway Age Gazette* never, either in the editorial from which the Firemen and Enginemen's Magazine quoted, or in any other, either directly or by implication, advocated "involuntary servitude" either for all railway employees, or any individual employee. We are quite aware, as is learnedly pointed out by our contemporary, that "involuntary servitude" is prohibited by the Constitution of the United States. Furthermore, not only have we never advocated any kind of legislation which would make it impossible for railway employees as individuals to quit their jobs, but we have never advocated, and do not now advocate any kind of legislation which would make it unlawful for any or all of them to strike. What we have advocated in the past, and what we advocate now, is federal legislation which will make it illegal for railway employees to strike until some body representing the public (preferably the Interstate Commerce Commission) shall have held hearings regarding the subject matter of any controversy that may arise, and rendered a report indicating how, in its opinion, the controversy ought to be settled, in fairness to the parties directly concerned, and to the public. We would have the law such that, if, after such an investigation and report had been made, either the railways or the employees wanted to disregard it they could do so, thus reserving to the latter the right to strike.

Clearly, this would not establish "involuntary servitude" for the employees. It would merely compel both them and the railways to submit their differences to some public body for hearing and report so that the public could be informed as to the true merits of the issues involved before they would be allowed to resort to desperate and destructive measures. The trouble with the present Newlands arbitration act is that a lockout or a strike may be resorted to before there has been a public investigation of the merits of a controversy. The advantage of the proposed system would be that there could not lawfully be a lockout or a strike until there had been a public hearing and report, and that public opinion would so strongly support the findings of a public tribunal that in a large majority of cases neither the railways nor the employees would dare refuse to abide by them.

The system proposed is very similar to that established by the Lemieux act of Canada; and it is the system which the *Railway Age Gazette* has advocated for years. All the talk about this paper, or railway officers, for that matter, advocating "involuntary servitude" is silly bosh intended to mislead the members of the labor brotherhoods and the public, and the leaders of the brotherhoods know it is as well as anybody else.

THE FEDERAL VALUATION

RAILWAY men have watched with a great deal of interest the activities of the federal valuation forces as they have been organized and have undertaken the solution of their unusual problems. In this work, which is very largely without precedent, it is to be expected that wide differences of opinion will arise regarding many details. In fact, railway men themselves have differed widely in their attitudes on many of the fundamental principles involved. It is not, therefore, surprising that exception has been taken to some of the findings of the federal forces in the first tentative reports which they have submitted on the properties of three of

the smaller carriers. These reports, which are discussed in another column, are of particular interest to railway men in all branches of the service, as they give the first intimation of the attitude of the government on some of the fundamental principles involved in the valuation which are of vital importance to the carriers with which they are connected.

In work such as this the professional reputations of the men in charge are at stake, as it is assumed that their decisions reflect their best efforts to determine the correct solution of the problems involved. While it is true that the reports as presented at this time are tentative and were probably brought to the attention of the carriers in an informal way in order to ascertain their attitude on certain points before placing them in final form for presentation to the Interstate Commerce Commission, they undoubtedly represent the attitude of the valuation department and its ultimate decision upon most of the points involved. The methods of the federal forces have been freely criticized (sometimes unjust, and without a full knowledge of the facts) as being impractical. It is highly important from their standpoint that they allay any such feeling as far as possible, because the creation of a feeling of confidence among the carriers and the public at large is essential to the ultimate success of this work.

The federal forces occupy a judicial rather than a partisan position, their problem being not to eliminate all possible elements of cost to keep the valuation down to the minimum, but rather to ascertain the fair value of the properties under consideration on the different bases specified. They must assume that the lines have been built under conditions encountered in actual practice, rather than under ideal conditions. It is in details such as these that experienced railway engineers measure the practical ability of the government forces.

Among the conclusions in the reports discussed to which the carriers take exception is the time allowed for construction. The carriers maintain that in all the three instances referred to in the article, the period specified is too short, and that it would not be practically possible to complete the lines in the periods specified. This is a question of experience rather than one of theory, and the best measure of the reasonableness of the periods specified is secured by a comparison with the time actually required to construct similar lines under similar conditions. It would undoubtedly have been physically possible to construct some of these lines in the time specified by the government if large forces had been organized and the work pushed without regard to cost. But the government has not figured the cost of the work on this basis, and no railway would build a line in this way. The problem of the federal engineers is to determine what the construction would have cost under the methods which they would have followed had they been in responsible charge of the construction. It is doubtful if they would be willing to stake their personal reputations upon the completion of all of these lines in the periods stated and for the costs allowed.

Likewise, the carriers attack the implied conclusion of the government representatives that the contract prices for grading comprise the entire cost of this detail of construction. Every engineer knows that contract work entails other expenses properly chargeable only to this account and which are as much a part of the cost of this work as the money paid to the contractors. The transportation of contractors, men, equipment and supplies is only one item of this class. Likewise, while theoretically there should be no waste of track materials in the construction of a line, practical experience has proved that there is always a certain loss even with the most careful supervision. To ignore such elements of cost is to deny actual matters of record. Also, while under ideal conditions it would be necessary to finance the work only as it progresses, practical experience has shown that this cannot be safely followed, but that money must be arranged for a sufficient time in advance to insure that it will be available to meet the bills as they become due. This must be considered

when making proper allowances for the amount of interest accruing during construction.

While it is not to be expected that the representatives of the government and the carriers will agree upon all the points in question, it is to be hoped that in the final reports they will be found to be in accord upon all those questions of practical experience which are matters of record, leaving for the possible attention of the courts later only those problems which are of legal uncertainty at the present time.

STANDARDIZING SIGNALS AT HIGHWAY CROSSINGS

FOR a committee of only eight men to represent, truly and effectively, 100 million people, is a rather unusual occurrence, except in the halls of Congress; but that is what may fairly be said of the committee of state commissioners and railway managers who recently met in Chicago to consider the question of safety at highway crossings, and whose doings were reported in the *Railway Age Gazette* last week, page 157. It is safe to say that they did accurately voice the sentiments of the people of the whole country; and, what is more, that they aimed their resolutions in the right direction. A less important body of men might see and define the need of meeting the crossing-safety problem, but these representatives are particularly well situated to influence the right persons and to do whatever may be necessary to convert their good resolutions into actual accomplishment. This is a comparatively new problem, and it is highly desirable to secure uniform action throughout the United States, for the automobile and other improvements are constantly tending to make of the whole country a single neighborhood. Moreover, the duty of state railroad commissioners to guide and instruct their respective legislatures—a particularly plain and important duty in this case—is one which demands quick action all around.

That these eight men truly represented all parts of the country, and all shades of opinion will be seen from the care with which they limited their recommendations for action to points on which there can be no reasonable difference of opinion among legislators or others who may be called upon to act. The thing to do is to adopt without delay such standards as can be agreed upon, even if the introduction of ideal conditions has to be deferred for a time.

The two most important features of the committee's report are the cautionary approach signal and the red light. The placing of the responsibility for maintaining the caution signal is a question yet to be dealt with; but the clear declaration that such a signal is needed is an important point settled. How far away from the track; whether in the middle or at the side of the highway; how far above the ground; how and when to be artificially lighted; these and other details must be agreed upon as soon as practicable. It is to be hoped that both of the organizations,—the National Association of State Commissioners and the American Railway Association—will give their committees extensive authority, for some of these details are of that character which will permit of interminable discussion where there are many men to discuss; while yet the interests of all may be truly subserved by summary action, in the spirit of compromise, as soon as there is a full understanding among those who have most thoroughly studied the problem. New Hampshire already has a law requiring the cautionary or distant signal, and the useful experience of the officers of that state can be made available for all states.

The question of the color of the light to be used at night, —to be hung on the gates or to be swung by the hand of the crossing attendant—is one which the railroads ought quickly to settle among themselves. To make the use of red universal will necessitate a change on many roads; but,

without doubt, the committee is fully justified in deciding in favor of red. Red is nearly or quite universal as a night warning in city streets, and in no detail is uniformity more desirable than in this matter of a warning light. Red is called by scientific men the most "arrestive" color. In addition to using the accepted stop color, there may be a need of considering uniformity in other respects. There are crossings with gates, crossings with automatic bells and no gates, and crossings where there is a flagman but no gate or bell; and the use of lights, their position, number and size ought to be made as nearly uniform as possible.

A railroad superintendent has a valid objection to the free use of red lights on the ground that they will stop trains, or, at any rate, will annoy enginemen and perhaps introduce an element of potential danger. This difficulty, however, has been met satisfactorily by using a four-sided light, the two sides facing enginemen being made dark or made to show some color other than red; and the need of uniformity, the comparative ease with which cities and all public bodies will undoubtedly be brought to agreement on that color, and the simplicity of the question, ought to be sufficient to bring all railroads in line in support of the position taken by the committee.

The public service commissions of the country are to be congratulated on the vigor with which they have taken up this question and the businesslike action of their committee. New legislation is needed and is sure to come; and that it ought to be uniform goes without saying. The commissioners, the American Railway Association and the American Automobile Association (with which conferences are being held) have an unusual opportunity to mark real progress.

BROOKLYN RAPID TRANSIT

WHEN the Brooklyn Rapid Transit undertook its share of the new dual subway system for New York city, involving, as it did, the extension of existing lines and additions to the parent company's facilities, it was thought that there might be so small a margin over dividends that the advisability of continuing the 6 per cent rate would be questionable. This was because new lines which would have to be taken into operating expenses as soon as they were put in operation would not be likely to prove immediately profitable. There has been an unexpectedly satisfactory increase in business with the installation of new facilities. In the fiscal year ended June 30, 1916, net income available for dividends amounted to \$5,612,000, which left a surplus over and above the 6 per cent dividends of \$1,145,000.

The subsidiary company of the Brooklyn Rapid Transit, which is working jointly with the city in building the Brooklyn Rapid Transit's part of the new dual subway system, is the New York Municipal Railway Corporation. This company has now spent \$40,835,000 under city contracts and the company has completed or has under contract nearly all of the new lines and improvements which it obligated itself to build. The results of operation of these new lines also have been rather unexpectedly satisfactory. None of the lines from which a large net revenue is anticipated have been placed in operation. The operating company is the New York Consolidated Railroad and from August 4, 1913, when operation of some lines was begun under city contracts, to June 30, 1916, net earnings have been sufficient to make good all of the company's first preferential of \$3,500,000, with the exception of a few thousand dollars. Nineteen sixteen contributed \$424,000 more than interest charges and the first preferential of that year, which amount was applied toward reducing the deficiency of previous years. President Williams, in his annual report for the year ended June 30, 1916, calls attention, as he did last year, to the delays in opening new lines caused by the city's failure to perform its part of the work. Delays on the Broadway subway have

been especially long drawn out. These criticisms are entirely justified, despite the attempts of the New York World to make them out hypocritical. The delays on the city's part in a number of instances are due to the failure of government officials comprehensively to plan out a big piece of work, so that those parts which are needed first will be ready first. It is not so much due to incompetency on the part of the present New York administration as to the mass of red tape which is wrapped about any large project which the city undertakes.

Total operating revenues of the Brooklyn Rapid Transit (this is the old company and does not take into its accounts direct the operations of the building company for the dual subways or the operating company) amounted to \$27,949,000 in 1916, an increase over the previous year of \$1,521,000. Operating expenses amounted to \$15,694,000 in 1916, an increase of \$734,000. A part of this increase in expenses is due to a greater volume of traffic handled and a part is due to an increased scale of wages which the Brooklyn Rapid Transit voluntarily established the first of January, 1916. The increase in passenger earnings over 1915 was 6.28 per cent. The number of passengers carried was 728,466,000, as against 689,823,000 in 1915, and the earnings per revenue car-mile were 27.4 cents in 1916, or exactly the same as in 1915. The average earnings per passenger were 3.72 cents in the year 1916 and 3.69 cents in 1915.

The Brooklyn Rapid Transit can set a good example to many well managed steam roads in the work which it is doing to improve the personnel and morale of its employees. Not many years ago Brooklyn Rapid Transit motormen and conductors had the reputation of being a pretty hard lot. They were probably painted blacker than they really were, but there has been a very decided improvement in the last few years.

For the first time in 1916 an opportunity was given to the employees to participate in group insurance, and of the 8,000 employees eligible for this insurance, 6,300 took out policies. The insurance was offered to all employees who had been in the service of the Brooklyn Rapid Transit two years or more and each employee was insured for \$1,000 without medical examination. A very low premium was secured, but furthermore the company itself pays half the premium on policies of \$1,000 for employees whose wages do not exceed \$3,000 a year. The company also assumes the entire premium on \$1,000 of insurance when the insured employee retires under the pension rules of the system. Participation in the insurance plan was made contingent on belonging to the Employees' Pension Association. This association has, since its foundation, paid out \$346,543 in sick benefits and \$150,000 on account of deaths of members.

The Brooklyn Rapid Transit now has a staff of six physicians employed continuously in the work of the Medical Inspection Bureau. The work of this bureau includes inspection of all candidates for employment in the transportation department; compulsory medical inspection and free medical attendance for transportation employees and free medical attendance for members of the Employees' Benefit Association outside of the transportation department; medical attendance for all employees in any department injured in the course of their duties; the instruction of certain employees in first aid work, and periodical re-examination of all motormen.

If the public but realized it the greater part of the annoyances to passengers on elevated, subway and surface lines is due to incompetent or uninstructed employees in transportation service. In treating its employees fairly, in paying them well, in holding out inducements for them to continue in the employ of the company, the Brooklyn Rapid

Transit is striking at the root of this evil. It is therefore rendering a public service which the public will only come to appreciate some years after the company has been hard at work on it and after a very considerable amount of money has been spent in that way, and probably the great majority of the public will never realize or appreciate the connection between better service and this humane far-sighted attitude toward retaining employees. However that may be, the fact will remain that what the Brooklyn Rapid Transit is now doing is just as sure to accrue to the benefit of the public as it is to the benefit of the employees.

NEW BOOKS

Voting Trusts. By H. A. Cushing. 226 pages. Published by the Macmillan Company, New York. Price \$1.50.

With the number of railroad companies now in the hands of receivers, the majority of which will presumably be reorganized within the next few years, a comprehensive discussion of voting trusts is of timely interest. The book which H. A. Cushing, of the New York bar, has written on the subject deals with both the legal aspects of what may and may not be done by means of voting trusts, and also with the economic significance of this form of insuring control by a certain group of interests or individuals. In so far as railroads are concerned, a voting trust is a device which has been used many times to insure supervision of operations and management by the interests which underwrote a reorganization plan when the company was taken out of the hands of receivers, and often it has been a device by which creditors of the company continued in control of its affairs after the property had nominally been turned back to stockholders. In the proposed reorganization of the St. Louis & San Francisco one provision from which the Missouri Public Service Commission withheld its approval was the formation of a voting trust.

Mr. Cushing's book is interestingly written and his analysis of the significance of voting trusts to which he devotes the first 35 pages is lucid and well worth while. This is the part of the book which will appeal to the general reader; but if even the general reader wants to make at all a thorough study of voting trusts he will read with interest the other three sections which deal with the Contents of Voting Trusts, the Law of Voting Trusts, Forms Relating to Voting Trusts.

Modern Framed Structures. By J. B. Johnson, C. W. Bryan and F. E. Turneaure, Part Three, Design, rewritten by F. E. Turneaure, dean of the College of Engineering, University of Wisconsin, and W. S. Kinne, associate professor of structural engineering, University of Wisconsin. 486 pages. Illustrated. 6 in. by 9 in. Bound in cloth. Published by John Wiley & Sons, New York. Price \$4.

This is the third of a series of three volumes, constituting a complete rewriting of the well-known "Modern Framed Structures," first published in 1893. The earlier volumes of the new edition cover the subject of stresses in simple and complex framed structures. This volume is devoted to detailed design and unit stresses, and is a fuller treatment than that given in the original book. It contains considerable material based on the work of the Committee on Iron and Steel Structures of the American Railway Engineering Association, of which one of the authors is a member. In addition to an analytical treatment comprising the several chapters on stresses and those on riveted joints, plate girder bridges and truss bridges, the book contains a manual for the student and designer which consists of chapters comprising complete outlines of the design of a plate girder bridge, pin connected and riveted truss spans, a highway bridge and a roof truss. Forty-six pages of the book are devoted to appendices, containing the specifications for steel railway bridges of the American Railway Engineering Association, some tables and a treatment of the subject of bending in planes at oblique angles with the principal axes of structural members.

Letters to the Editor

THE DISREGARD OF CAUTION SIGNALS

OTTUMWA, IOWA.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Since writing the letter on the necessity for observance of distant signals which was published in the *Railway Age Gazette* of May 5, under the heading "The Importance of the Distant Signal," I have received a copy of the report on the government's investigation of the accident at Milford, Conn., signed by H. W. Belnap. This is certainly an illuminating document, and I cannot refrain from commenting on its most prominent feature. When an accident of this kind occurs on a first-class railroad with the finest system of signals, etc., it is time to do something. A careful reading of the government report seems to indicate the cause of this collision very clearly and decisively.

The speed diagram drawn by the government inspectors and published in this report indicates that the second train passed a good many of the caution signals when they were indicating caution without decreasing speed, and the chief inspector says, "The evidence seems to justify the conclusion, as is indicated on the diagram, that train No. 5 had been passing without decreasing speed most of the distant signals at caution since leaving tower 75." In other words, according to the investigation, there was a mechanical flagman about every $\frac{3}{4}$ -mile to a mile for several miles east of the point where the accident occurred, and each of these flagmen was saying "caution" to the engineer of the second train, and yet in broad daylight, in clear weather, he absolutely disregarded all of these mechanical flagmen and struck the read end of the preceding train which had been brought to a stop.

How is it, then, that the chief inspector says in substance that he is unable to find the real cause of the accident because "all of those whose testimony would throw any light on the reason why the signals were not observed and obeyed met death in the accident, and any explanation that might be offered would simply be one of conjecture." In the face of what happened and his own observations, why did he not say the cause of the accident was, first, that the trainmen are being allowed or taught to disregard caution signals; second, that high-speed trains are permitted to close up and break down space intervals between running trains by a disregard of the caution signal, which if obeyed would readily space the trains at a proper and safe distance from each other; and, third, that under the peculiar mental process which is unable to conceive of more than one train or more than one block section, it is assumed that greater speed can be made by permitting trains to disregard the caution signal, and the rules are therefore framed to allow this extremely unsafe practice.

The chief inspector, in effect, says that he does not know the real cause of the accident, but at the same time his report indicates very clearly that the operating practice referred to, which is the real cause, was very definitely determined and the recommendations for improvement are very clear. If they were carried out thoroughly, instances of this kind would be very rare, indeed. In view of all of the excellent observations and recommendations by the chief inspector in regard to the operating method in use in this case, the only mystery about this matter is why he did not put his finger on the real cause and give it the prominence it deserves. The series of disasters of this nature during the past five years on first-class railroads with the best known signal systems certainly should make apparent, even to the beginner in railroading, the danger of the practice of dis-

regarding caution signals and framing the rules to permit this.

Even at the present time the American Railway Association's code is fathering this dangerous practice by the recently approved signal rules. The need for an immediate reconsideration of the signal rules, which were recently adopted, and of an immediate going back to first principles is so apparent that it should hardly be necessary to talk about it.

L. R. CLAUSEN.

WHAT ABOUT THE OTHER 82 PER CENT?

HARRISBURG, PA.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The railroads of the United States and part of Canada are now confronted with one of the most serious problems they have ever been called upon to solve and the solution is being awaited with more or less uneasiness by a larger number of workers than were ever before concerned in a similar controversy. The managements of these different railroads are confronted with the task of settling a wage controversy that is recognized as being the greatest demand ever made upon them at any one time in the matter of wages.

The different organizations from which come this demand represent men engaged in train service and known as trainmen. These enginemen, firemen, conductors, flagmen and brakemen have collectively and unitedly presented to the operating officers of their respective railroads, a demand, the contents of which are well known to almost every worker in the United States. The extraordinary increase of wages demanded and which these men hope to receive, if granted to them, will, when compared with the wages of other skilled labor, easily prove them to be the highest paid workers in the world.

When we take into consideration that the wages of the trainmen were so recently and satisfactorily adjusted (they must have been satisfactory because the railroads conceded every demand made, even to the point of establishing a precedent in granting these men back pay, and dating the back pay from the date their demands were first presented until the time when the conditions were agreed upon) the seriousness of the present demand must impress every one of us. Think of a band of men already considered the highest paid workers in the world demanding a basic eight-hour day, which, when stripped of its masquerading cloak, means in reality an increase of 25 per cent on the present wages up to the expiration of the first eight hours and for every hour or portion thereof thereafter an increase of $87\frac{1}{2}$ per cent, and the enormity of the demand will be plain to everybody.

This demand or set of demands is bound to work hardship upon every other wage earner in the country and it is in behalf of one of these other classes of wage earners that this article is written.

Statistics show that only 18 per cent of the railroad employees are trainmen. Only 18 per cent of the railroad employees will thus be favored by the above mentioned demands. To the other 82 per cent of employees the result will be not only unfavorable but harmful, as the writer will endeavor to show.

The first question that presents itself is, "What effort will the railroads make to retrieve this money if the demands are granted?" and any logical-minded man will agree that they will make some effort, because it is not their aim to increase operating expenses but to decrease them and to increase net profits. This being the case let us note the different ways by which they may be disposed to bring back to their treasuries an equivalent for that which they have handed over to the trainmen without receiving the slightest benefit in return.

First; they might, as in the past, appeal to the Interstate Commerce Commission for permission to increase

freight or passenger rates or both, and by such permission endeavor to retrieve an equivalent sum for the money that the trainmen receive. This would be an extortion upon the public and is hardly to be expected in view of what the Interstate Commerce Commission said in reference to such an appeal several years ago before the trainmen received their last increase. At that time the commission said in part: "This Commission certainly could not permit the charging of rates for the purpose of enabling the railroads to pay their laborers extravagant compensation as measured by the general average compensation paid in this country as a whole."

Second, they have at their disposal another method, the availability of which is best attested by the use to which it has been put in the past, as the writer and others can testify. This is the method of cutting down operating expenses in other departments and it acts by reducing the wages of certain employees when this can be done without incurring any danger from such employees, or by the elimination of every last job that it is not indispensably necessary to retain. In this way the work formerly done by the men whose jobs have been eliminated is crowded on to others who are already overworked and receive no increase in pay.

The work in the telegraph, clerical and other departments has steadily increased from year to year owing to legislative action of the different states and of Congress and Interstate Commerce Commission rulings. Chief among these measures and harassing restrictions are:

The requirements of the 8-hour and 16-hour laws, requiring constant checking and much clerical labor.

Two pay days a month, doubling the work in the time-keeping department.

The Interstate Commerce Commission rulings on rate legislation, the handling of livestock and explosives, safety appliance equipment and many other matters of equal importance, obedience to which is swamping the railroads with red tape and almost incalculable clerical work.

All of these have entered into the work of these different departments in recent years and there has been only such an increase in the forces as has been found absolutely necessary.

It is upon this class of employees that the burden of the trainmen's demands will fall, because when 18 per cent of the employees of a railroad receive 28 per cent of the payroll it is very evident that the other 82 per cent of the employees are carrying the load. And when on the top of this, these 18 per cent employees ask for such increases as they have asked for, it is only the more evident that an additional burden is passing to the shoulders of those who are even now carrying the load when these demands serve to increase the percentage of the payrolls in favor of the trainmen—men whose conditions have become more and more favorable each year, men for whose safety the law provides every known protection, and for whose convenience and comfort the companies leave nothing undone; men who have recently had their forces increased by the "full crew" laws, men whose demands upon capital have been favorably acted upon in every instance, men who at the present time do less than one-half of the work once done for one-third of their present pay.

The task of imposing this additional burden upon the shoulders of an overworked and underpaid set of men will be a mighty hard one, as already the rumblings of discontent are becoming louder and louder, and unless the railroad officers are both blind and deaf, they must hear them. These rumblings are the cries of the men upon whom, to a great extent, the prestige and success of a railroad must rest. A canvass of the intellectual ability of this class of men as against that of the trainmen will show the trainmen sadly deficient both as to education and ability, and

now as in the past or future these two vital factors are the basis of success in all undertakings.

Can the officers of the companies involved ignore the sounds of discontent coming from the 82 per cent of the employees, the larger part of whom are compelled to work more than eight hours a day, especially when those who work only eight hours and are included in the requirements of the eight-hour law are compelled in most cases to work 365 days a year and on a monthly rate of pay, with deductions for every hour lost?

Leading students of economy and labor agree that the wages of the 82 per cent class have not kept pace with the rapidly advancing cost of living and are at the present time not as near a living wage as in former times.

There are also other conditions, such as pass privileges, enjoyed by the trainmen which never reach the other employees, as well as seniority rights as shown by rosters and many other conditions not affected by wages.

In many cases we find the officer in charge of the trainmen or under whose control they labor, working 12 hours per day or night as the case may be, for a salary far below that of the trainmen, all of which serves to make it harder for him to retain their respect and maintain the discipline so necessary for the successful operation of the railroad.

I repeat, can the railroads ignore the signs of dissatisfaction which are daily finding room and growing in the ranks of the men who are not members of the "Big Four" and invite unto themselves a demand like that of the trainmen, or court indifferent, dissatisfied and unintelligent work from a force of men who are capable of greater efforts and greater work?

When we review the conditions of the trainmen which have so rapidly become so favorable and reached such a high state, and note that these concessions by the companies to the trainmen have had the result of spurring them on to greater demands and more menacing attitudes toward the companies, is it any wonder that the 82 per cent men who have had so little inducement to perform their best, are becoming disloyal, are lending their ears to the insidious influence of the labor agitator, who is now for the first time in the history of the railroads finding a fertile field, entirely unopposed by the men themselves, for his labor agitation?

Men of long years of faithful service, who have shunned unionism with its autocracy in the past, are now, as never before, becoming impressed with its startling value, as encouraged by the railroad companies' readiness to agree to and grant demands and by the public approval of their methods. Soon, very soon indeed, the "Big Four" will have to admit another member and become the "Big Five" or it will have a rival far greater in numbers and well nigh invincible in strength.

Will the railroads refuse the trainmen their demands and favor the deserving employees with better conditions and calm their unrest and dissatisfaction, thereby facing the menace attached to the trainmen's demands, which is, "Refuse us our demands and we will strike"?

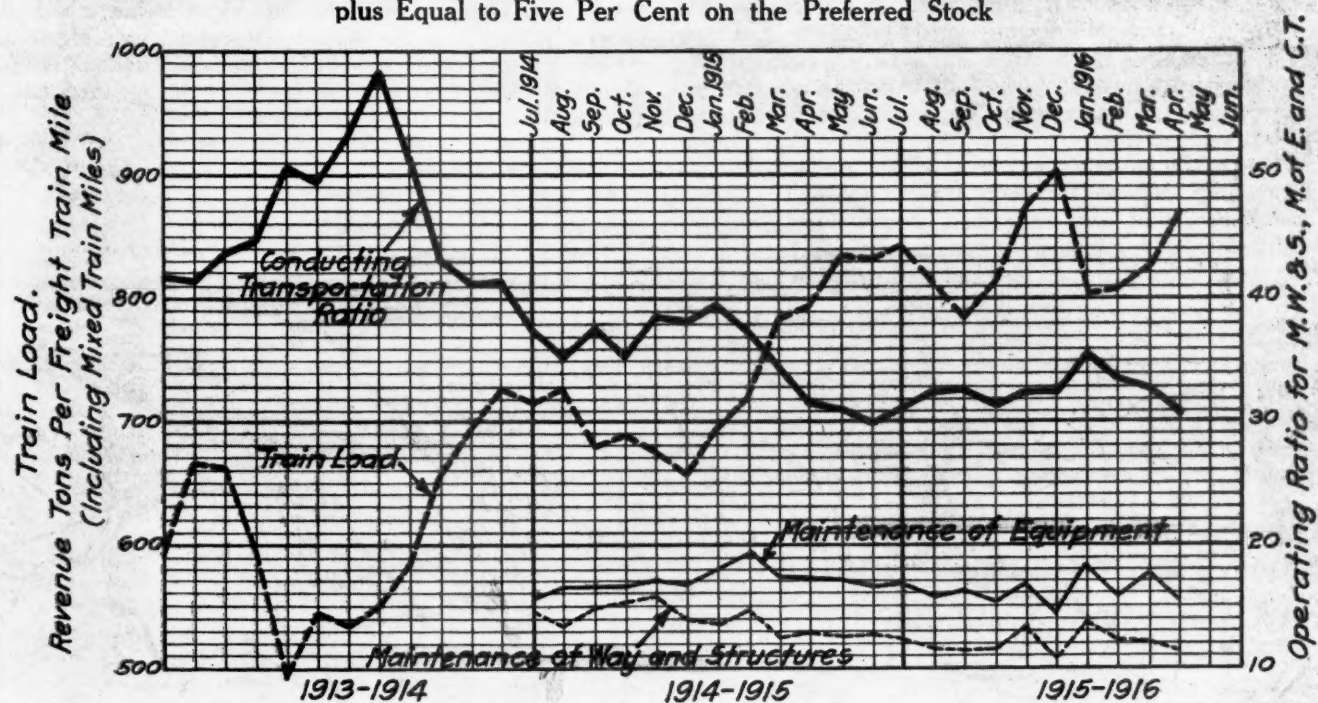
So much has already been said in reference to what a strike of such magnitude would mean, its cost to both the railroads and the public alike, that it is unnecessary to state that grave danger exists, and the outcome of the present controversy will be watched with great interest and much concern to all.

T. H. E. REDDING.

SIX MONTHS' TUNGSTEN PRODUCTION. — The tungsten production of the United States during the first six months of 1916 exceeded the production of this or any other country in any previous 12 months. Prices reached more than ten times their ordinary level largely because of the need for high speed steel. The output was equivalent to about 3,290 short tons of concentrates valued at \$9,113,000.

Studies in Operation—The Western Maryland

From a Deficit of Nearly Three Millions to a Surplus Equal to Five Per Cent on the Preferred Stock



THE Western Maryland after paying interest charges on its bonds and charging out interest on \$13,000,000 notes, which are in default, will have about \$500,000 available for dividends on its \$10,000,000 preferred stock. In the fiscal year ended June 30, 1914, the company had a deficit, after the charges for interest, of \$2,716,000. Gross earnings, of course, have been much higher in 1916 than in 1914, but more important than the increase in gross, has been the fact that whereas the ratio of transportation expenses to gross reached 58 at one time in 1914, it has been at no time in 1916 above 35, and in most months has been in the neighborhood of 32.

Before describing conditions in 1913 and 1914, a brief history of the property will be essential.

In 1905 the Western Maryland operated 544 miles of road, the greater part of which was main line. This main line ran from Baltimore via Hagerstown, Md., and Cumberland to the West Virginia coal fields at Elkins, with various branches extending out from Elkins into the coal region. Originally the road had been built to take lumber out of West Virginia; the last of this lumber is now being cut. Prior to 1900, and for a few years thereafter, the road was owned by Baltimore capitalists. By 1906 the Goulds with the help of Rockefeller capital had acquired control. It was planned to use the Western Maryland as the Atlantic Seaboard outlet for the Pacific to Atlantic railroad system which George Gould attempted to piece together. The Wheeling & Lake Erie was to have been connected with the Western Maryland at one of the Western Maryland's western termini. The scheme fell through. Gould properties one after another went into the hands of receivers, but apparently additional investments were made in Western Maryland, by the Rockefellers.

THE SITUATION IN 1913 AND 1914

B. F. Bush, who at that time was the joint selection of the Goulds and the Rockefellers, was elected presi-

dent of the Western Maryland in 1909. Timber was furnishing less and less traffic for the Western Maryland and the Baltimore & Ohio, which parallels the Western Maryland from Cumberland to Baltimore, was making a successful fight for a large proportion of the coal from the West Virginia fields destined for Baltimore, or for points reached by the Philadelphia & Reading. Although the Gould scheme for making the Western Maryland part of a trans-continental system had fallen through, the idea of making the Western Maryland something more than a coal road persisted. Under Mr. Bush's management an extension was planned from Cumberland north to Connellsville, where connection with the Pittsburgh & Lake Erie of the New York Central system could be obtained. This line would parallel the Baltimore & Ohio and be extremely expensive, but it was built, nevertheless.

The line was 90 miles long and cost \$13,000,000. It climbed up out of Cumberland northbound with grades of 92 ft. to the mile, reaching an altitude a little south of Deal, Pa., of nearly 2,400 ft. From there it dropped down to Connellsville, with some grades against southbound traffic of 42 ft. to the mile.

A traffic agreement was made with the Pittsburgh & Lake Erie and a good deal of advertising was devoted to the fact that the Western Maryland would give the New York Central lines a Baltimore outlet, and would permit competition with the Baltimore & Ohio on import business from Baltimore for the West. Most of the talking about this, however, was done by the Western Maryland. As a matter of fact, very little business from Baltimore, either of import or of any other nature, developed for movement via the Western Maryland to the New York Central lines. Some business is being given by the Pittsburgh & Lake Erie to the Western Maryland at Connellsville, which is not by any means as much as was expected, and the fact that the New York Central is giving and not receiving is an explanation of the lack

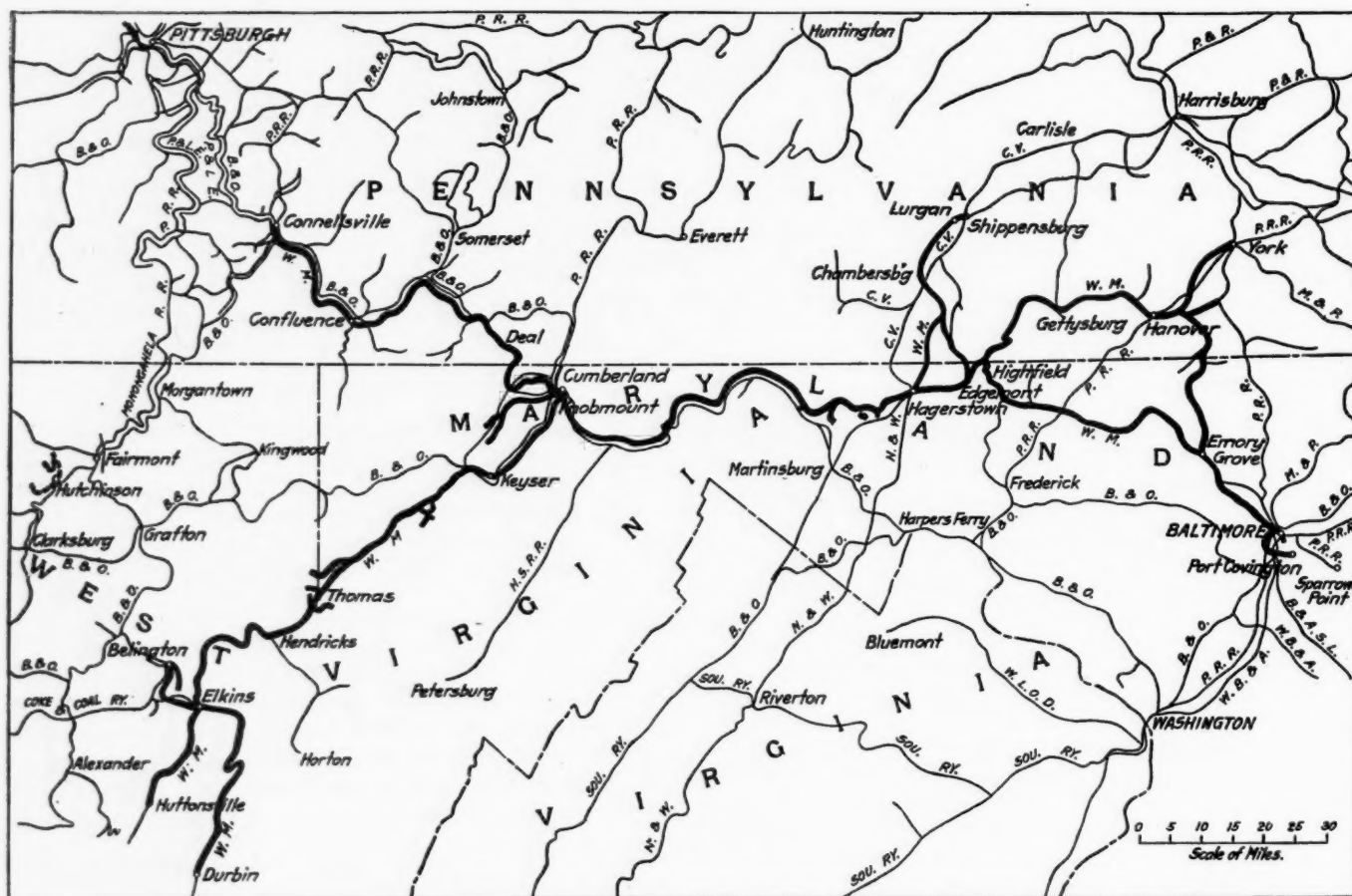
of enthusiasm on the part of the New York Central traffic officers in respect to the "Baltimore outlet."

Mr. Bush left the Western Maryland in 1911 to become president of the Missouri Pacific. He was succeeded first by A. Robertson and then by J. M. Fitzgerald. The building of the Connellsville extension had been an unbearably heavy strain on the Western Maryland's credit at the time when it was essential that considerable sums should be spent for heavier locomotives, increased shop facilities, strengthening of bridges and roadway, renewal of ballast, and other improvements which would permit the economical handling of coal and other traffic, much of it low grade—the Western Maryland's average ton-mile rate was 5.24 mills in 1915—in competition with the Baltimore & Ohio.

The need for at once reducing expenses was imperative, and therefore heavy locomotives were ordered, but these orders were placed before track and bridge conditions or shop facilities were adequate to permit of the operation of this heavier

land and accepted. He brought with him only two men, S. Ennes, who had made an extraordinarily enviable reputation as a superintendent on the Great Northern, and M. C. Byers, who had been chief engineer of operation of the St. Louis & San Francisco when Mr. Gray was there, and had been made assistant to the president of the Great Northern in March, 1913. Mr. Ennes was made general superintendent and later general manager of the Western Maryland and Mr. Byers assistant to the president. It was generally understood that no other changes were to be made in the organization, if patience, a square deal for everyone and straightforwardness could prevent it. The following table shows the principal figures in the income account for the fiscal years June 30, 1913, and June 30, 1914:

	1913	1914
Mileage operated	543	661
Coal and coke freight revenue.....	\$3,362,307	\$3,749,996
Miscellaneous freight revenue.....	2,912,095	3,127,766



The Western Maryland

power and heavier trains; the result was that expenses climbed up abnormally.

To straighten out conditions required time, courage, confidence, a sureness of touch founded on broad experience and, in addition to this and many other things, two absolutely essential conditions. One of these was a degree of confidence in dealing with the board of directors, and especially with the controlling interest which had become centered in John D. Rockefeller, that only a railroad president with an exceptional reputation would be likely to have. The other was a knowledge of the detailed cost of doing business. Apparently the management in 1913 did not have either of these last two essential qualities in a degree great enough to meet the needs of the situation.

In March, 1914, Carl R. Gray, then president of the Great Northern, was offered the presidency of the Western Mary-

Passenger revenue	996,691	1,021,816
Total operating revenue	7,632,679	8,267,736
Maintenance of way and structures	1,155,972	1,588,476
Maintenance of equipment.....	1,240,825	1,887,555
Traffic expense	189,602	280,045
Transportation expense	3,271,908	3,825,336
General expense	161,640	267,220
Total operating expense	6,019,147	7,848,631
Taxes	240,000	263,205
Operating income	1,375,873	154,147
Gross income	2,459,923	381,602
Interest and other fixed charges.....	2,874,896	3,097,267
Deficit	414,973	2,715,665

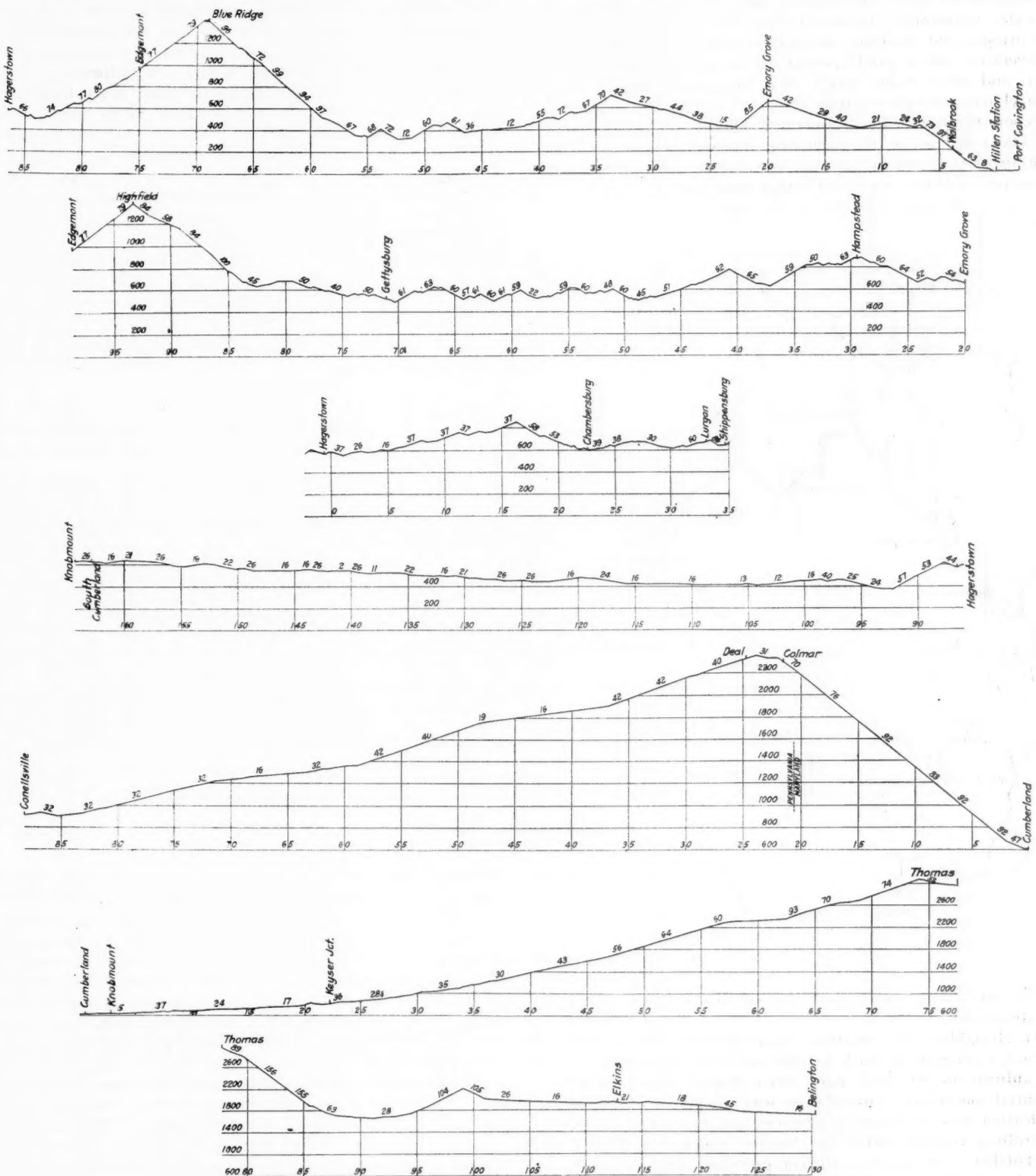
It will be recalled that the new management went to the Western Maryland in March, 1914. The figures for the 1914 fiscal year, therefore, represent about eight months of the old management and the first four months under the new management.

During the first four months the new management devoted its attention almost entirely to two main problems, one a study of the property and organization, with, of course, the traffic and the other to the taking up of deferred maintenance. Nothing which the new management has done since is any surer proof of courage and ability to live up to well-founded

of this policy have both been justified in an almost dramatic way.

DESCRIPTION OF THE PROPERTY IN 1914

In 1914 the Western Maryland was operating 661 miles of road, the main line extending from Baltimore, with double



Profile of the Western Maryland

convictions than the fact of turning in such an income account to the board of directors as that shown above for 1914. The convictions which led to the policy pursued in the four months ended June 30, 1914, and the faith on the part of the board of directors which did not balk at a frank pursuit

track to Emory Grove and with two single track lines from there, one via Gettysburg and one via Thurmont to Charmian, Pa., and with a single track line from there to Cumberland; also a single track line from Cumberland to Connellsville northwest and a single track line from Cumberland to Elkins

southeast, with branches from there to Durbin, Huttonville and Belington.

The profile shows the grades on the main lines as they are now. Very little change in grade line has been made since 1914. In 1914 twenty heavy Consolidation locomotives were received and five switching locomotives. The Western Maryland has two principal shops, one at Hagerstown and one at Cumberland. The facilities at neither one of these shops were adequate to take care of the new heavy engines. In the first four months of the fiscal year ended June 30, 1914, 11 locomotives were scrapped and 50 engines were sent to outside shops to be repaired. Engine failures in the early part of 1914 were abnormally high.

Side track maintenance had been so inadequate that in some places it was almost, if not quite, dangerous to take a freight train with a heavy locomotive on to a side track, even when the greatest care was used.

FIRST STEPS TOWARD REHABILITATION

No monthly detailed transportation cost figures were being kept when the new management took the Western Maryland in March, 1914. The installation of a monthly set of reports was at once ordered, showing a complete income account according to the Interstate Commerce Commission's classification, complete maintenance and transportation expenses by

car-mile, per freight train mile and per freight engine mile.

The road was divided into six accounting districts, the first extending from Baltimore to Hagerstown, including both the Gettysburg line and the Union Bridge-Thurmont line; the second district, Hagerstown to Shippensburg and Edgemont to Quinsonia; third district, Hagerstown to the east end of Cumberland yard; fourth district, Cumberland to Connellsville; fifth district, Cumberland to west end of Thomas yard; sixth district, everything west of Thomas.

It was found necessary to abolish one of the three operating divisions, that with headquarters at Baltimore. Baltimore is properly a terminal and to combine the operations there with the operations of a part of the main line west thereof is confusing, insofar as cost accounting is concerned. Partly for this reason and partly because of reasons connected directly with the practical operation of the road, which will be gone into more fully in describing the present situation, a third division was not economical. This change gave an opportunity to use a certain discretion in the retention of operating officers, but, as a matter of fact, the officers who are in charge of those sections of the road outside of the third division simply had their authority extended in such a way as to round out their divisions.

Even a superficial inspection of shop facilities showed that the shops at Hagerstown and Cumberland were neither of

FORM C T 180.			THE WESTERN MARYLAND																	
19			TONNAGE TRAINS																	
Per Cent. of Total Engine Efficiency Unused			Total Ton Miles to Date		Total Cost to Date		Cost Per 1000 Ton Miles				No. of Train Miles		No. of Engine Miles		Cost Per Train Mile					
Sheet No. 1	Rating Haul This Date		This Month	Last Month	This Month	Last Month	This Month	Last Month	This Date	Last Year	This Date	Last Year	This Date	Last Year	This Date	Last Year				
	1st Acctg. Dist.	%																		
	2nd " "	%																		
	3rd " "	%																		
	Eastern Division	%																		
	4th Acctg. Dist.	%																		
	5th " "	%																		
	6th " "	%																		
	Western Division	%																		
	System	%																		

Helper Eng. From To	TRAIN, ETC.				OUT OF TERMINAL				TON MILES OF ENGINE EFFICIENCY LOST (AND CAUSE)								
	Director	Conductor	Engineer	Train	Engine	Leaving	Capacity in Tons	Tons Moved	% of Capacity Moved	No. of Cars	Actual Ton Miles Moved	Mech'l Defects	Fuel Freight	Set Out and Local Work	Nothing to Move and Car Limit	Weather Conditions	Ton Miles Should Have Moved

Form of Daily Report

primary accounts as prescribed by the Commission showing both the current month, the previous month and the corresponding month in the previous year, as well as the cumulative figures for the fiscal year to date and the corresponding period for the previous year; detailed maintenance and transportation and other expense figures by primary accounts for the month and for the corresponding month of the previous year divided as between freight and passenger for the system and also for each accounting district, and freight statistics by accounting districts for the current month and the corresponding month of the previous year. These freight statistics included each general class of expenses in freight service; each general class of expenses per train-mile, per locomotive-mile and per hundred net ton-miles. The freight statistics sheet also included a statement showing tons one mile, tons one mile per mile of road, tons per loaded car-mile, tons per loaded and empty car-mile, tons per freight train mile, tons per freight engine mile, percentage of switching to total freight engine mileage, percentage of empty to total freight car mileage, percentage of all freight engine mileage to freight train mileage, percentage of helping to freight train mileage, and freight earnings per mile of road, per ton-mile, per loaded

them adequate to make repairs to the locomotives, which were obviously desperately in need of repairs. About 50 engines were sent to outside shops at an aggregate expense of approximately \$300,000. There were 538 freight cars, 20 passenger cars and 11 locomotives, none of which were in condition to justify repairs and all of which were scrapped. This was all taken up in operating expenses, except such amounts as had already been accrued in depreciation; from the 1914 balance sheet it would appear that such accrued depreciation, if there was any, must have been very small.

Strengthening of side tracks was imperative. This work came under the head of maintenance and included both tie and rail renewal. Bridge strengthening was also necessary on some parts of the line and tie and ballast renewal was necessary on a good part of the main line. The entire main line had been ballasted at one time or another, and under the Interstate Commerce Commission's rules, therefore, it was proper to charge the cost of ballast to maintenance expenses, although a less liberal interpretation of the commission's rules might have been so made as to permit the charging of a good part of this work to capital account. In the fiscal year ended June 30, 1914, there was \$1,588,000 spent for

maintenance of way, an increase of \$433,000 as compared with the previous year. Almost all of this increase was during the four months, March to June, inclusive. The amount spent in 1914 for roadway and truck was 52.19 per cent more than in the previous year; for ballast, 61.57 per cent; for ties, 43.35 per cent, and for rails, 27.45 per cent. There was only \$13,530 charged to capital account for ballast in 1914 and \$2,189 in 1915 and correspondingly small amounts during the year just ended. Nothing was charged to capital account for ties in 1914 and only a few thousand dollars in 1915. The present condition of track, with the exception of less than \$50,000 for additional weight of rail and a little over \$100,000 for other track material—tie plates, etc.—represents the expenditure for maintenance work and the application of maintenance of way labor to track.

It was decided, despite the temptation to rush matters, to give each section foreman a regular gang of seven men, to let him keep his gang at full strength the entire year, and to do away, except in real emergencies, with extra gangs. The expenditures for additional weight of rail, it will be noticed, are very small. The standard had been 90 lb. and on June 30, 1913, the average weight of rail in main and second track was 82.21 lb. and by June 30, 1914, had been brought up to 83.34 lb. Heavier rail fastenings were needed at a good many places and all new rail was laid on tie plates, the stand-

and later general manager, and M. C. Byers, assistant to the president. There was a departmental form of organization already established, and while the traditions of the president and his assistant and his general manager were such that they probably believed in divisional organization, no change was made. The operating organization was naturally rather demoralized. Trainmen were never sure when they started out with an engine how far they were going to get; maintenance people had been pounded pretty hard to hold down expenses, with the result that they necessarily gave the transportation officers and employees pretty poor material to work with, both in regard to locomotives and cars and condition of roadbed. The showing made in the latter half of the calendar year 1913 and the first month of 1914 looked very bad. As a matter of fact, however, the personnel of the operating officers on the Western Maryland was high. For operating purposes the road is now divided into an eastern and western division; the former is divided into six districts and the latter into five districts. The eastern division has a superintendent, assistant superintendent, two trainmasters, a chief train despatcher and assistant, a road foreman of engines and an assistant road foreman of engines. The western district has a superintendent, three trainmasters, a chief train despatcher and two assistants, and a road foreman of engines. As soon as trainmen and operat-

[illegible]

Form of Daily Report

and adopted by the new management being a large plate slightly thicker at the outside of the rail than at the inner edge, with a smooth under-surface.

Before any expenditures were made for expensive additions and betterments to structures and shop a very careful study of the needs of the property was made. The mere fact that a roundhouse or other structure looked dilapidated was not taken as conclusive evidence that a new structure had to be built. It was nearly two months before plans for new shops were decided on, and then an addition was made to the Hagerstown shop which more than doubled its capacity and rendered it, with the Cumberland shops which also were improved, capable of repairing the equipment now in service. During the latter part of 1914 there was approximately \$200,000 spent on shops, enginehouses and terminals, which represented additional capital expenditure, and about an equal amount for shop machinery and tools, which also represented capital expenditures.

ORGANIZATION

The new management consisted of Carl R. Gray, president and chairman of the board; S. Ennes, general superintendent

ing officers found that the new management was dead in earnest in trying to help them in every way possible, it was remarkable how quickly they got their shoulders to the wheel. The keynote of the change which has taken place in the Western Maryland organization may be summed up in the one word "confidence." Trainmen, operating officers, mechanical officers and engineering officers recognized that they had a management which thoroughly understood the business of railroading and was ready and able to give any help that was necessary. When the operating organization had been gotten into this frame of mind it became a question of a detailed study and analysis of expenses.

DAILY REPORTS OF INDIVIDUAL FREIGHT TRAIN EXPENSES

One of the illustrations shows the blank form which was introduced for daily train tonnage reports. The headings are self-explanatory and all of the figures required to fill in this form are derived from the train despatcher's sheets and from fuel reports. The train despatcher's sheets are, of course, accurate; the fuel reports are not absolutely accurate, since there is no device in use on the Western Maryland for measuring the coal delivered to the locomotive tenders. During the last year, however, much interest has been aroused among offi-

cers and employees in charge of fuel stations in making the estimates of fuel delivered to tenders as accurate as possible and it is believed that the results which are now being obtained are very close approximations to the actual figures. The study of these daily tonnage reports taken in connection with a study of the monthly statements mentioned previously for each accounting district makes a very comprehensive analysis of the cost of doing business on the Western Maryland.

THE RESULTS NOW BEING OBTAINED

The Western Maryland now operates 661 miles of road. Of this, 292 miles is main line owned, 97 miles is branch lines and spurs owned, 150 miles is leased lines, 50 miles is operated as "operated lines," 68 miles is the Connellsville & State Line Railway, the subsidiary company which built the Connellsville extension, and 3 miles is operated under track-age rights. The proportion of leased line looks large, but as a matter of fact the annual payment for rent of this leased line is only \$121,567. Of the total tonnage carried by the Western Maryland in 1915, 70.49 per cent was products of mines, 12.49 per cent manufactures, 9.20 per cent products of forests, 3.86 per cent general merchandise, 2.72 per cent products of agriculture and 1.24 per cent livestock and products of animals. By far the greater part of the Western Maryland's traffic is eastbound. Coal traffic is of first importance, and passenger traffic is but an unimportant part of the total business and is not considered particularly profitable. Of the total revenue for the 11 months ended May 30, 1916, amounting to \$9,937,000, only \$866,000 was passenger revenue, and the total passenger service revenue, including this \$866,000, was but \$1,138,000. The determining factor in expenses is the expense of moving coal traffic eastbound; this fact should be kept in mind in an analysis of the figures for revenue and expenses by districts.

The freight that originates west of Cumberland is divided at present in the proportion, approximately, of 175 loads a day from Connellsville and 340 loads from the line that runs from Elkins to Cumberland. The Western Maryland climbs both the Blue Ridge and the Alleghenies, besides which it has some heavy grades on its short line between Hagerstown and Baltimore between the Blue Ridge mountains and Baltimore. Although the line from Edgemont via Gettysburg is 80 miles, as against 55 miles via Thurmont, the longer route is used for eastbound heavy freight traffic. Nearly three-fifths of the coal traffic, however, does not go over either the Thurmont or Gettysburg line; it moves from Hagerstown northeast to Lugan and Shippensburg, where it is delivered to the Philadelphia & Reading. The coal which originates west of Thomas has to be hauled up over the Alleghenies against a grade of 156 ft. to the mile, five miles long. The larger part, however, of the coal comes from Thomas and branch lines east of Thomas and has, therefore, no bad grades, the heaviest being 37 ft. to the mile, except for one short grade just west of Lugan, which is 60 ft. to the mile.

Total operating revenues in the 11 months ended May 31, 1916, amounted to \$9,937,000, an increase as compared with the corresponding 11 months of the previous year of \$2,098,000. Total operating expenses amounted to \$6,453,000, an increase of \$744,000. Of this increase \$240,000 is accounted for by an increase in the expenses for maintenance of equipment and only \$377,000 by an increase in transportation expenses. The earnings and expenses per freight train mile by districts in May, 1915, and May, 1916, gives a fairly good idea of the character of the different accounting districts of the road.

	Expenses		Earnings	
	1916	1915	1916	1915
First district	\$3.29	\$2.80	\$2.95	\$2.92
Second district	1.87	1.85	4.47	4.13
Third district	2.54	2.86	6.92	7.35
Fourth district	2.01	2.17	4.15	3.30

Fifth district	2.35	2.39	4.74	4.64
Sixth district	2.63	2.82	1.71	1.77
Entire road	\$2.52	\$2.49	\$4.36	\$4.21

It will be seen, therefore, that the second, third, fourth and fifth districts are the ones that are profitable, that is, the Hagerstown-Shippensburg line, Hagerstown-Cumberland line, Cumberland-Connellsville line and the Cumberland-Thomas line.

Taken in connection with a study of the profile, the comparison between earnings per train-mile and per engine-mile by districts is interesting. For the first district it was \$2.95 and \$2.45 respectively in May, 1916; second district, \$4.47 and \$3.51; third district, \$6.92 and \$5.47; fourth district, \$4.15 and \$2.64; fifth district, \$4.74 and \$4.40, and sixth district, \$1.71 and \$1.09. The average cost in cents per hundred ton miles in May, 1916, and May, 1915, by districts was as follows:

	1916	1915
First district	56.30	48.08
Second district	21.16	22.58
Third district	18.52	19.57
Fourth district	24.44	33.16
Fifth district	25.07	25.94
Sixth district	78.03	80.35
Average for system	29.22	29.83

OUTLOOK FOR THE FUTURE

The balance sheet when it is made up for June 30, 1916, will presumably be a considerably better looking statement than that for June 30, 1915, but if taken by itself without consideration of what has been done in the improvement of the operation of the road it will look more like a receiver's balance sheet than that of a company which is being operated by its stockholders. As of June 30, 1915, there was \$735,000 cash on hand, with \$3,785,000 loans and bills payable and \$890,000 interest matured and unpaid; a debit to profit and loss of \$3,148,000; \$12,735,000 unextinguished discount on stock and \$558,000 unextinguished discount on funded debt. The fact of the matter is, of course, as everyone who has followed the situation knows, that in 1914 the Western Maryland was insolvent, but was being carried by its own stockholders. It was a brand snatched from the burning, probably because John D. Rockefeller did not want the name of Rockefeller connected with a railroad failure.

There is every present prospect, however, that, like other ventures with which this name has been connected, it is going to be by no means a failure. The present rate of earnings is higher than it would be under normal conditions were no new developments being carried on to provide for a large increase of traffic. As a matter of fact, however, very important developments are taking place which, unless something unforeseen happens, will not only maintain the present volume of traffic, even were the European war to come suddenly to an end, but will steadily increase traffic. The same interests which control the Western Maryland now have a very large, if not actually, controlling interest in the Consolidation Coal Company. This company was at one time operated in fairly close harmony with the Baltimore & Ohio, but is now working with the Western Maryland. The Western Maryland has just built a short track about a mile long to the new Davis Coal & Coke Company mine at Davis, W. Va., from which it is expected that the daily output will be 1,000 tons. The Western Maryland is also building three miles of track to new Consolidation Coal Company mines in the Somerset district and this work is about 80 per cent. done. From these mines it is expected that there will be 500 tons of coal sent over the Western Maryland a day. The company is also building a 20-mile road with yard connections to connect with the Baltimore & Ohio at Chiefton, W. Va., and to reach, via the Baltimore & Ohio, three new Consolidation

Coal Company mines in the Fairmont district. This work is 50 per cent done and the mines are shipping a small amount of coal now, but it is expected that they will ship within a year 1,000 tons a day over the Western Maryland. These improvements will insure an increase of about 2,500 tons a day, or 900,000 tons a year. This alone ought to make up for any loss of business due to the cessation of the European war.

At Baltimore the Western Maryland has a poorly situated passenger station, known as the Hillen station; to reach it the Western Maryland has either to use the Pennsylvania tracks or the Baltimore & Ohio tracks; at present it is using the Pennsylvania, by the use of whose tracks it gets into the union station, but the rental is fairly high.

Freight facilities at Baltimore are better than almost anyone who has not made a close study of the property even suspects. The Western Maryland has its own right of way through South Baltimore to Port Covington, with a large yard at Port Covington, a large pier and grain elevator, and ample ground for the expansion of these facilities to take care of the greatest development of the port of Baltimore which even the most enthusiastic Baltimorean could hope for. A very good bargain has been made with the United States government by which the Western Maryland gives up a piece of its Port Covington land, necessary to the government to get a straight deepwater channel to the drawbridge which is being built across the estuary which runs from Chesapeake bay at Port Covington, in exchange for the right to extend the present pier head line out several hundred feet. While this bargain was probably advantageous to the government it was certainly a most excellent piece of business for the Western Maryland, giving it a pier head line which will permit a number of the largest grain boats to load alongside the pier at one time. The right of way from the main line to Port Covington is ample for four tracks, so that in this most important particular of terminals the Western Maryland has almost unlimited growing room.

The Western Maryland has also been shrewd and foresighted in getting into industries along the Port Covington waterfront in territory which the Baltimore & Ohio up to a few years ago considered exclusively its own. There are large fertilizer, acid and other manufacturing plants in this territory, many of them affiliated with the Standard Oil interests. Here, then, possibly is the foundation for the west-bound business which will mean so much to the Western Maryland both in permitting a lower operating ratio and in bargaining at Connellsville with the New York Central for eastbound business.

The grain elevator and storage tanks at Port Covington are of the most modern construction. The elevator is one of the most economically operated in the country; it was built by the same man who built the grain elevator for the Great Northern at Duluth, but its economy of operation has profited much by the experience gained in building the Duluth elevator. At present new grain storage tanks are being added which will increase the storage capacity by 150 per cent. More than 75 per cent of this work is now completed. An additional yard is being built at Port Covington to accommodate 300 cars, and this work is 25 per cent completed. There are also additional tracks being built at Wagner's Point, South Baltimore, to serve large industrial concerns by car float and this work is 50 per cent completed. In addition, a new engine terminal and car repair facilities have been authorized at Port Covington, but have not yet been started. The land for these, of course, is owned. There are now 200 miles of automatic block signals in operation.

In addition to the improvements which have been mentioned above and those being made in connection with the development of the coal mines of the Davis and Consolidation Coal companies, there is 3.7 miles of second track being

built from Pen Mar to Edgemont, which work is about 75 per cent done. There is two miles of second track from Security to Hagerstown freight yard, on which about 25 per cent of the work is done. There is six miles of second track from Clearspring to Big Pool, of which 10 per cent of the work is done. There are also authorized, but not yet begun, seven additional classification tracks at Hagerstown yard and two 125-car departure tracks; a new line from Connellsville to a connection with the Baltimore & Ohio at Fairmont; a new yard with four 100-car tracks; a wye and engine terminal to care for the business from the Fairmont district on which work has just been started, and four 100-car departure tracks at Cumberland for which land has just been bought.

The doubt that arises as to how great the future development of the Western Maryland can be comes from the fact that the road does not get into Washington. It cannot, therefore, make a bid for traffic from the southeastern roads and this lack of westbound traffic is a limiting factor in its development. Apparently the management believes that by developing port facilities at Baltimore this handicap can be overcome. There is, of course, another possibility, and that is for the Western Maryland to acquire a connection to Washington. The Washington, Baltimore & Annapolis electric line has a fairly good right of way from the heart of Baltimore across the Western Maryland tracks leading to Port Covington to the District of Columbia line outside of Washington. Whether or not such an extension as this will be necessary is a question that cannot be answered definitely. The management is going ahead with plans which, if as successful as they hold out prospects of being, would make the Washington connection unnecessary insofar as making a sound, solvent, profitable property out of the Western Maryland.

MACHINE COLLECTION OF TICKETS AND FARES BY SOUTHERN PACIFIC

By William S. Wollner

On account of the large increase in the traffic through its San Francisco ferry depot during the Panama-Pacific International Exposition last year, the Southern Pacific found it advisable to replace the system of manual collection of tickets and cash fares, then in use, by experimenting with ticket and coin-collecting machines, and as the result of their successful operation the machines installed at that time are now a permanent part of the station equipment. In addition to the through travel there is handled through the ferry depot the suburban traffic to the communities on the east shore of San Francisco bay, with a service of 908 trains per day and ferry steamers plying between San Francisco, Oakland and Alameda.

The ticket-collecting machines were first installed and later they were supplemented with a coin-collecting device. A great many single trip tickets were sold through the ticket windows and it was found that the services of the ticket-sellers could be dispensed by requiring payment of the fare at the ticket gate.

A count made on December 15, 1914, before the coin-collecting machines were used, showed that 4,364 single-trip tickets were collected between 4.30 and 6 o'clock in the evening. In addition to these single trips and through fares, about 12,500 monthly commutation tickets are sold and a great many free tickets are used by company employees.

It was formerly the practice for the ticket collector at the ferry depot to take the ticket or coupon from the passenger's hands and cancel it with the usual form of ticket punch. With the use of the ticket-collecting machine the passenger deposits a commutation coupon directly into a receiving chute, from which it drops onto an inspection plate illuminated by an electric light bulb. This gives the

collector, who stands facing the machine, an opportunity of seeing whether the coupon is of the proper date, then by means of a lever placed alongside the inspection chamber the collector tips the inspection plate so that the coupons drop into a compartment below containing rolls for cancelling the tickets. The tipping of the lever starts an electric motor which operates the rolls. No count is kept of the number of tickets deposited or cancelled.

Through tickets, passes and similar forms of transportation, are collected by the gateman and punched as before, but an effort is made to handle all passengers, except suburban passengers, through a separate gate.

Passengers who formerly purchased single-trip tickets at ticket windows and handed them to gatemen for cancellation now deposit the amount of the fare directly into the collection chute. The collector is prohibited from depositing the coin for the passenger. The exact fare being deposited passes over the illuminated inspection plate, and when the collector tips the lever alongside the box it drops into the coin scoop compartment. The tipping of the lever actuates the electrically-driven registering device and all coins are registered in terms of nickels, each 10-cent fare registering as two 5-cent fares, a quarter registering as five fares, etc.

After passing through the counting device the coins drop into three separate compartments, for nickels, dimes and quarters. These are accessible to the collector and the money taken from them is used for making change or for transfer to a drawer provided for the purpose. While the machines will only register nickels, dimes and quarters, coins of any denomination may be deposited, the larger coins passing into a locked box from which they are removed in the presence of the collector by the man who checks the register and removes the cancelled coupons. The coin device will accommodate as many as 100 coins per minute and will register as high as \$5,000 in nickels.

To assist the gateman in making change for passengers quickly a coin-changing device is suspended in front of the machine and is detachable from it. This device includes four tubes—one for quarters, two for dimes and one for nickels, with a total capacity of \$35. The device is operated by four keys marked 10 cents, 25 cents, 50 cents and \$1. When a key is depressed the exact amount of change, after deducting the 10-cent fare, is dropped into the operator's hand, and handed by him to the passenger for deposit in the coin-collecting device. During rush hours a man whose sole duty is to make change is stationed in a booth near the ticket gate, thus relieving gatemen of this work.

Each collector, when he reports for work is supplied with his own change-making device and a supply of coin. He takes this with him when he reports at the gate and attaches it to the ticket collecting machine. He then signs his initials on the card of the man he is relieving to check the closing number shown on the register of the machine and fills in this same number on his own card. When he is relieved from duty the collector fills in the closing number on his card and has it O. K.'d in the same manner by the collector who relieves him. He then fills in the number of nickels registered and converts the total into dollars and cents. He also lists on the card the coin turned over to the cashier at the end of the shift, which is signed for by the cashier as received. The card is then sent to the auditor of passenger accounts for his information and records.

The Southern Pacific handles 1,955,000 persons through its gates and has six machines of this type in service at the San Francisco Ferry Depot at a total cost of maintenance of about five dollars per month. As a result of the success of this installation a similar one is to be made by the San Francisco-Oakland Terminal Railways at the San Francisco Ferry Depot. The machine is known as the Volgesong Combination Receipts Machine and is made by the American Coin Registers Company, Oakland, California.

DISASTROUS EXPLOSIONS AT JERSEY CITY

By a fire which was followed by numerous explosions of dynamite and ammunition of various kinds, in cars and on barges, which started at Black Tom Island, so-called, Jersey City, N. J., on the morning of Sunday, July 30, about 1 o'clock, property aggregating in value from \$10,000,000 to \$20,000,000 was destroyed, and a number of lives were lost. At last accounts, five persons were known to have been killed, including the chief of police of the Lehigh Valley Railroad, and a number of others probably had been drowned with small vessels. Scores were injured. The center of the disaster was on the docks of the National Dock & Storage Company, most of the space on which was leased to the Lehigh Valley Railroad. Of twenty-four big storehouses owned by the Dock Company, thirteen were destroyed, and a number of others were damaged. The six piers occupied by the tracks of the Lehigh Valley were destroyed, and with them eighty or more loaded freight cars. A number of freight cars on floats were also destroyed or sunk. Several barges containing explosives were set adrift, and caused havoc at points where they landed or when they struck other vessels. The first explosion was at 2:08 a. m. It broke hundreds of window glasses in Manhattan, three miles away, and caused similar but less serious damage at points farther off. A half



hour later, another explosion of equal or greater violence occurred; and smaller explosions continued at intervals for several hours afterwards, as the fire reached different cars or boats.

An officer of the Lehigh Valley reported that the fire started in a barge belonging to a towing company which had been moored at the railroad company's dock, contrary to orders and in violation of law. The fire in a short time spread from the barge to cars standing nearby. In one of the warehouses there was about 40,000 tons of raw sugar, valued at approximately, \$3,400,000; and large quantities of tobacco, salt and other merchandise were destroyed.

Cases of explosives which had been hurled from burning barges were found floating in New York bay and in the North river five miles away, on Monday and Tuesday, constituting a grave menace to shipping.

According to Frank Hague, commissioner of public safety, of Jersey City, the reason for the tying up to the Lehigh pier of the Johnson barge, which was loaded at the pier of the Central Railroad of New Jersey, was to save \$25 in towing charges.

Four men were arrested charged with manslaughter, namely: E. L. McKenzie, president of the National Dock & Storage Company; T. B. Johnson, president of the Johnson Lighterage & Towing Company; Alexander Davidson, superintendent of the National Storage Company piers, and Albert M. Dickman, of Jersey City, agent at the Black Tom piers of the Lehigh Valley Railroad.

Meeting the Federal Headlight Requirements

A Discussion Dealing With Incandescent Electric Equipment, and a List of Publications on Headlight Subjects

By L. C. Porter

THE recent Federal legislation* requirements governing locomotive headlights will unquestionably start an active search for literature, and probably cause tests to be conducted by various railroads in the immediate future, in order to determine the best method of meeting the new specifications. A brief outline of what has been accomplished and references to some of the literature already available, may be of assistance in solving the problem. It is not the intention of the writer to enter into a discussion of the merits or otherwise of the new ruling, but rather to describe equipment, including principles involved in its design and operation, which will comply with the law, and to suggest methods of test and desirable specifications for such equipment.

The primary function of a headlight is to project illumination to a distance. There are two methods of doing this, in common use: One by passing the light generated through a lens and thus concentrating the rays into a beam; the other by reflecting the light rays by use of a reflector of parabolic shape, which accomplishes the same result. With either equipment, if the light could all originate from a point source (a physical impossibility) located at the focal

of an incandescent lamp. Of these the size of the oil flame is the largest; next to this is the acetylene flame and then comes the arc. With the incandescent lamp, the size of the source depends upon how closely the filament is coiled. Especially on low voltage it is possible to secure a light source of very small dimensions. Assuming that we have a light source of constant area, the greater the volume of light emitted by that source—or, in other words, the higher its candlepower—the greater will be the intensity of the resultant beam.

The flame of the oil lamp is relatively of low intrinsic brilliancy—approximately 9 c.p. per sq. in. Hence, to obtain a large volume of light from this source would require a very large flame, and with a large flame as a light source for a headlight the spread would be too great to obtain a powerful beam. Oil headlights in common service today have beam candlepowers in the neighborhood of 2,500. The oil lamp, therefore, is practically eliminated from the possibilities of producing a beam of sufficient intensity to "pick up" a dark object at a distance of 1,000 feet. The acetylene flame is of considerably higher brilliancy.

There are two electrical means of meeting the require-

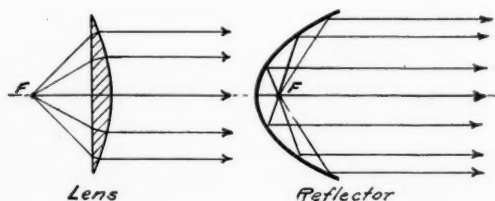


Fig. 1—Diagram Showing Projection of Light Rays from a Point Source Through a Convex Lens and Parabolic Reflector

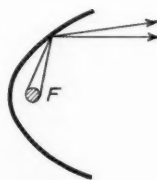


Fig. 2 — Diagram Showing Projection of Light from a Spherical Light Source in a Parabolic Reflector

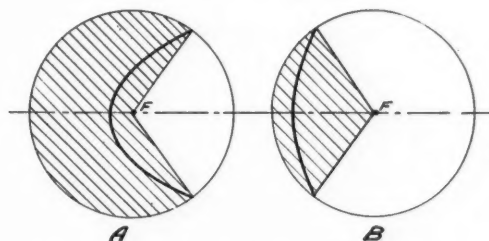


Fig. 3—Diagram Showing Amount of Light Utilized by a Short Focus and Long Focus Parabola of Equal Diameters

point of a perfect lens or reflector, the resulting beam would be parallel, and, neglecting atmospheric absorption, would reach to infinity. (See Fig. 1). However, all light sources have physical dimensions, and hence the beam from such a source used with a projecting lens or reflector will have a certain amount of spread, depending on the size of the light source, the focal length of the projector, etc. (Fig. 2). Its intensity is assumed to vary inversely as the square of the distance from the projector†.

It is apparent from Fig. 2 that the size of the light source has a very material effect upon the spread of the beam and, therefore, also upon its intensity. For, assuming that we have the same volume of light to work with, it is obvious that if it is spread out over a large area, as with a beam of large dispersion, the light intensity on this area must be lower than if all of the light were confined to a small area by projecting it as a narrow beam. Thus, the source of light has great influence on the resultant beam.

The most common light sources used for locomotive headlights are the flame of a kerosene oil lamp, the flame of an acetylene burner, the crater of a carbon arc and the filament

of a tungsten filament of a gas-filled lamp, operating at about 1,200 c.p. per sq. in., and the crater of the carbon arc, operating at about 84,000 c.p. per sq. in. Headlights of both types are available, giving beam candlepowers up to 1,000,000. Either of these sources will produce sufficient light in a small enough space to be used to good advantage for powerful headlight service.

Having a certain light source to work with, the resultant beam when this source is used in a projector, will also depend somewhat upon the size and design of the lens or reflector used, and also the accuracy with which the light source is located at the exact focal point. In general it might be said that a glass lens or a glass mirror can be ground and polished more accurately than a metal mirror can be spun; hence, where extremely powerful beams are required, such as in navy searchlights, or where a little "spill" or stray light is objectionable, such as in stereopticon work, the glass lens or mirror is usually used. For headlight service, however, neither extremely powerful beams nor ones with no stray light are desirable. In fact, some stray light striking the immediate foreground is highly desirable, enabling the reading of mile posts, whistle signs, etc. For this reason metal reflectors are most common in railroad headlight service. These may be made of polished

* *Railway Age Gazette*, June 16, 1916, page 1358.

† See *Transactions of Illuminating Engineering Society*, Vol. X, No. 1, 1915, p. 38. "New Developments in the Projection of Light."

aluminum, having a reflection coefficient of about 61 per cent; or of brass, nickel plated, with a reflection coefficient of about 54 per cent; or of brass, silver plated, producing a surface with 86 per cent reflection. The aluminum reflectors have the advantage that they can be buffed up an indefinite number of times, whereas the plating on the others gradually wears off with frequent polishing. Replating, however, is not a very serious problem, and many silver plated reflectors are in service. The reason for the nickel surface is that it does not corrode or tarnish quite so rapidly as silver.

Headlight reflectors are parabolic in shape, but vary as to depth and focal length. With a given diameter a short focus parabola (Fig. 3,A) will utilize more of the total light flux from a source than a long focus parabola (Fig. 3,B).

A description of most reflectors in common locomotive headlight service, including dimensions and photos of the complete headlight, may be found in Circular N, 1913-14, report of the committee on Locomotive Headlights, American Railway Master Mechanics' Association. This report also contains a very complete treatise of the whole headlight situation as it was at that time, and gives in detail tests conducted on the different types of headlights then on the market.

From Fig. 3 it can be seen that a parabolic reflector of

"pick up" a dark object the size of a man at 1,000 ft. is one which depends upon several factors; such, for example, as the color of the object, the contrast between the object and its surroundings, the atmospheric conditions, the quality of the headlight beam, etc. As some people see better than others, any observations should be made by several individuals, and precautions taken to insure the approximate representation of average visual power.

It is a curious fact that the quality or color of the beam has considerable to do with the effective pick-up distance. In tests conducted by the Railroad Commission of Wisconsin and reported at the October, 1912, meeting of the Western Railway Club; in tests conducted by the Southern Pacific and reported in the *Journal of Electricity, Power & Gas* for February 7, 1914, and also in tests conducted by the committee on Locomotive Headlights for the American Railway Master Mechanics' Association, reported in Circular N, 1913-14, it was found that for some reason or other it required a considerably higher beam candlepower where an arc headlight was used than with an incandescent headlight, to pick up a man at the same distance. A curve showing this difference was worked out for equivalent beam candlepowers and reported by the last committee in their circular W, 1914-15.

From data that the writer has been able to collect regard-

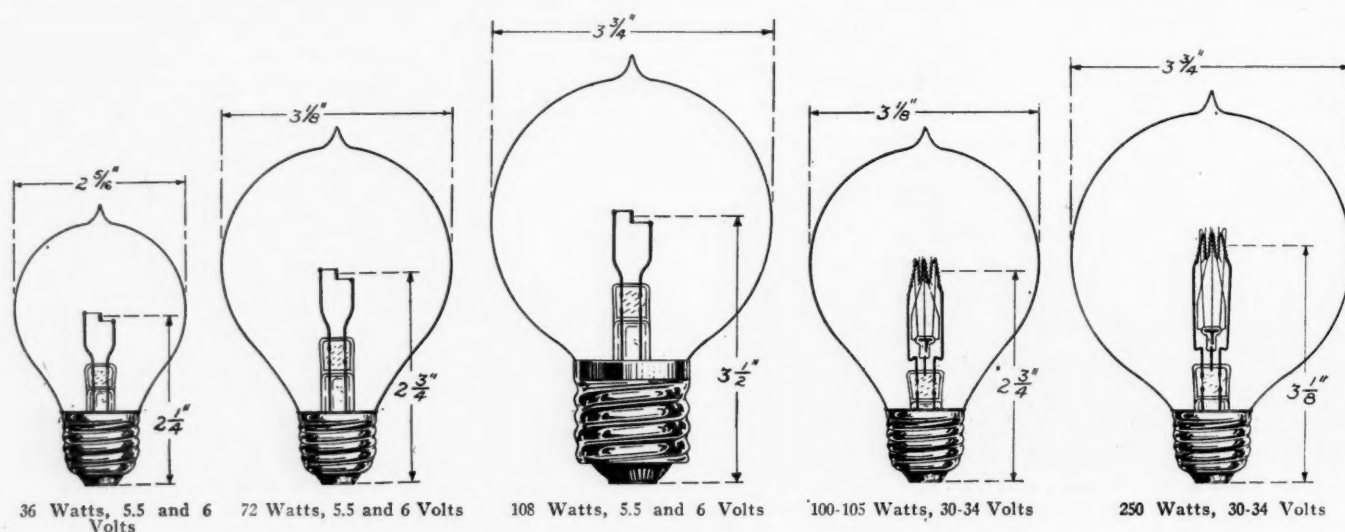


Fig. 4—Incandescent Lamps for Headlight Service

short focus is desirable on account of the high percentage of the light flux it will utilize. Where incandescent lamps are used as a light source, care must be taken not to use so short a focus reflector that the lamp bulb will strike the reflector and prevent the filament coming into focus. As focus-type incandescent lamps are generally made in round bulbs with the filament in the center of the bulb, we can state that the focal length of the reflector should not be less than half the diameter of the lamp bulb plus a small clearance space of, say, $\frac{1}{4}$ in.

Mention was made above of the importance of actually locating the light source at the focal point of the reflector. It is equally important to retain it at this point, and therein the incandescent lamp is of great advantage. Once it is properly set in place it stays there without further attention, until the lamp fails. When a new lamp is inserted it should be focused, as it is impractical to make all lamps, even of the same type, exactly true. Another advantage of the incandescent light source is that it is absolutely steady, and furthermore, the headlight (except for very high wattage lamps) can be made dust and moisture proof, thus reducing reflector tarnish to a minimum.

The question of how powerful a beam is necessary to

ing the Mazda lamp, it would appear that it is necessary to throw an intensity of from .05 to .1 foot-candles on a man in dark clothes, to render him visible at 1,000 ft. on the average railroad track. Formulas and curves for the beam candlepowers necessary, of both arc and incandescent headlights, to pick up men dressed in light, medium and dark clothes have been worked out and reported in a paper entitled "The Locomotive Headlight," given in the *Transactions of the Illuminating Engineering Society*, Vol. IX, No. 9, 1914, page 909.

It was previously mentioned that the light intensity from a headlight varies inversely as the square of the distance; therefore, taking the writer's maximum figure of .1 foot-candle, the beam candlepower of a projector which would deliver this intensity at 1,000 ft. would be $.1 \text{ F.C.} \times (1,000)^2$ or 100,000. A beam candlepower of this value is very easy to obtain with an incandescent lamp. There are 6-volt 36-watt incandescent headlight lamps, which will more than accomplish this result*. These are available in 36, 72 and 108 watt sizes, as shown in Fig. 4. The last size is the

*"Incandescent Headlights and Projectors," I. E. S. Transactions, Vol. X, No. 3, April 30, 1915, p. 271. The beam candlepower here given is maximum and not average across the beam. A higher wattage lamp is desirable to bring the average up to the 100,000 value.

standard headlight lamp at present used on the Southern Pacific. There are also available 30-34 volt incandescent headlights of 100, 150, 250 and 750-watt capacities, Fig. 4. Due, however, to the higher voltage of these lamps, their filaments are necessarily of finer wire and longer than those of the 6-volt type and, therefore, cannot be concentrated into so small a volume. This necessitates using a higher wattage lamp to obtain the same beam candlepower that is required with the 6-volt type. Many of the 30-34 volt lamps are, however, in service. The beam from the 30-34 volt lamps will also have considerably greater spread than that of the 6-volt lamps. A 150-watt 30-34 volt lamp will be required to equal the beam candlepower of a 36-watt 6-volt lamp.

For practical purposes, it is desirable that the spread of the beam should be at least sufficient to cover the entire width of the track, as obviously a very narrow beam might possibly have sufficient intensity without illuminating the full width. It is, of course, impracticable to provide light



Fig. 5—Adjuster for Converting Oil and Arc Headlights to Incandescent

that would take care of all curves. A reasonable test would take into account the intensity over the full width of a single track. The procedure is to set up the headlight and at a distance of not less than 100 ft. from it draw an arc across a diameter of the beam, having the headlight as its center. This arc should be marked off in feet, and foot-candle intensities measured across it at these points, by means of a portable photometer. The values thus obtained, if averaged and multiplied by the square of the distance from the arc to the headlight, will give the average beam candlepower of the headlight, and from the readings the spread can also be worked out. Detailed instructions for making such tests can be found in the *Lighting Journal*, Vol. 4, No. 1, January, 1916, in an article entitled "Photometric Measurements of Projectors."

As to the source of current supply for headlights, both storage batteries and turbo-generator outfits are on the mar-

ket. The latter are coming into increased use and are available for both 6 and 30-34 volt systems. The generators are of sufficient capacity to take care of cab and classification lamps in addition to the headlight, if desired. It is probable that where incandescent lamps are used, the 6-volt 108-watt and the 32-volt 250-watt lamps will be the ones most generally adopted, thus allowing an ample factor of safety in meeting the requirements of the law.

On locomotives at present equipped with arc headlights, the simplicity of control and maintenance of the incandescent lamp may make it desirable to replace the arc. In such cases it will not ordinarily be necessary to discard the old headlight, nor will this be necessary in the case of many oil lamps. The arc mechanism or oil lamp can be removed from the casing and the incandescent substituted. There is on the market an adapter, shown in Fig. 5, which can be used for this purpose. It consists of a Mogul socket mounted in such a manner as to be adjustable in three directions, thus allowing of accurate focusing of the lamp. The adapter can be easily screwed or bolted to the bottom of the headlight casing.

Standard incandescent lamps are available of various wattages, and such lamps are interchangeable, enabling a wide range of choice as to beam candlepower. In addition they possess simplicity of installation and maintenance, ease of dimming, give a constant steady light of satisfactory color, and are low in both initial cost and maintenance.

BIBLIOGRAPHY

- Headlight Tests, by Harding and Topping, American Institute of Electrical Engineers' Proceedings, Vol. 29, No. 7, July, 1910, page 1233.
 Headlight Tests, by Harding and Topping, Western Railway Club's Proceedings, April, 1910.
 Fundamental Principles of Head Lamp Illumination, by L. C. Porter and K. W. Mackall, *Electrical World*, July 19, 1913.
 Basic Principles of Head Lamp Illumination, by C. R. Sugg, *Electrical World*, October 11, 1913.
 Design of Head Lamp Light Sources, by A. R. Dennington, *Electrical World*, October 11, 1913.
 Our Headlight Laws, *Railway Electrical Engineer*, October, 1913.
 Installation and Maintenance of Electric Headlight Equipment, by V. T. Kropidowski, *Railway Age Gazette*, Mechanical Edition, March, 1914.
 Electric Headlights, by C. G. Scrugham, *Journal of Electricity, Power & Gas*, February 7, 1914.
 Notes on the Use of Mazda Lamps with Parabolic Reflectors, by G. H. Stickney, *General Electric Review*, December, 1912.
 The Locomotive Headlight, by J. L. Minick, *Illuminating Engineering Society's Transactions*, Vol. 9, No. 9, 1914.
 Incandescent Headlights and Projectors, by P. S. Bailey, *Illuminating Engineering Society's Transactions*, Vol. 10, No. 3, April 30, 1915.
 Locomotive Headlight Requirements, by E. S. Pearce, *Railway Age Gazette*, September, 1915.
 Railway Headlight Tests, by C. M. Larson, *Electrical Review*, October 19, 1912.
 Electric Headlights—Wisconsin Railroad Commission Tests, *Railway Electrical Engineer*, November, 1912.
 Electric Headlight Tests, by C. M. Larson, *Electric Railway Journal*, November 23, 1912.
 Electric Arc Headlights for Locomotives, by J. G. D. Mack, *Wisconsin Engineer*, December, 1912.
 Jurisdiction of Public Service Commissions (Indiana), *Electrical World*, June 28, 1913.
 The Standardization of Headlights, by L. C. Porter and K. W. Mackall, *Electrical World*, July 19, 1912.
 Electric Locomotive Head Lamps in Illinois, *Electrical World*, August 2, 1913.
 Pyle-National Headlight, Type "E," *Railway Electrical Engineer*, May 1, 1914.
 Report of Headlight Committee, A. R. M. M. A., *Railway Age Gazette*, June 5, 1914.
 Report of Headlight Committee, A. R. M. M. A., *Electric Railway Journal*, June 20, 1914.
 Electric Headlights, by A. G. Jones, *Journal of Electricity, Power & Gas*, October 17, 1914.
 Report by Committee on Electric Headlights, *Railway Electrical Engineer*, October, 1914.
 Locomotive Headlights—Committee of Association of Railway E. E., *Electrical World*, November 7, 1914.
 Locomotive Headlights in Vermont, *Railway Age Gazette*, January 22, 1915.
 Locomotive Headlights, *Electric Railway Journal*, June 12, 1915.
 Locomotive Headlights, *Railway Age Gazette*, June 11, 1915.
 Incandescent Headlight Equipment, *Railway Age Gazette*, June 9, 1915.
 Headlight Law, Nevada, *Railway Age Gazette*, July 2, 1915.
 Rules for Locomotives, *Traffic World*, October 2, 1915.
 Six-Volt Incandescent Headlights, *Railway Age Gazette*, December 10, 1915.
 Incandescent Electric Headlight Equipment, *Railway Electrical Engineer*, April, 1916.

Arc and Incandescent Headlights, by F. S. Bailey, *Coal Age*, April 29, 1916.
 Southern Pacific Six-Volt Electric Headlight Equipment, by A. H. Babcock, *Railway Age Gazette*, December, 1915.
 Locomotive Headlights (Committee on Data and Information), *Railway Electrical Engineer*, October, 1915.
 Incandescent Electric Headlight, *Railway Mechanical Engineer*, February 19, 1916.
 Incandescent Electric Headlight Equipment, *Railway Age Gazette*, February 18, 1916.
 Incandescent Headlights and Headlight Laws, *Railway Mechanical Engineer*, March, 1916.
 The Parabolic Mirror, by F. A. Benford, Jr., *Illuminating Engineering Society's Transactions*, Vol. X, No. 9, December 30, 1915.
 Proceedings A. R. E. E., Vol. 6, 1913, page 71.
 Special report, Headlight Committee, A. R. M. M. A., June, 1914.
 The Roundel Problem, by William Churchill, R. S. A., October 10-12, 1905.
 Encyclopedia Britannica, 11th Edition, Lighthouses.
 The Intensity of Natural Illumination Throughout the Day, by L. J. Lewinson, *Transactions I. E. S.*, Vol. 3, 1908.
 First Avon Tests, *Proc. Railway Commission of Indiana*, 1909.
 Proc. Western Railway Club, October 15, 1912.
 Letter and report to the Senate and House of Representatives of the State of Illinois, dated May 10, 1913, by S. M. Rogers, chairman.
 Brake Tests, Pennsylvania Railroad Test Dept., Bulletin No. 25, 1913.
 Incandescent Head Lamps, Editorial, *Electrical World*, October 11, 1913.
 Considerations in Design of Head Lamp Light Sources, by A. R. Dennington, *Electrical World*, October 11, 1913.
 Performances of Incandescent Head Lamps, by L. C. Porter, *Electrical World*, October 11, 1913.
 Incandescent Headlights for Street Railway and Locomotive Service, by P. S. Bailey, *General Electric Review*, July, 1916.

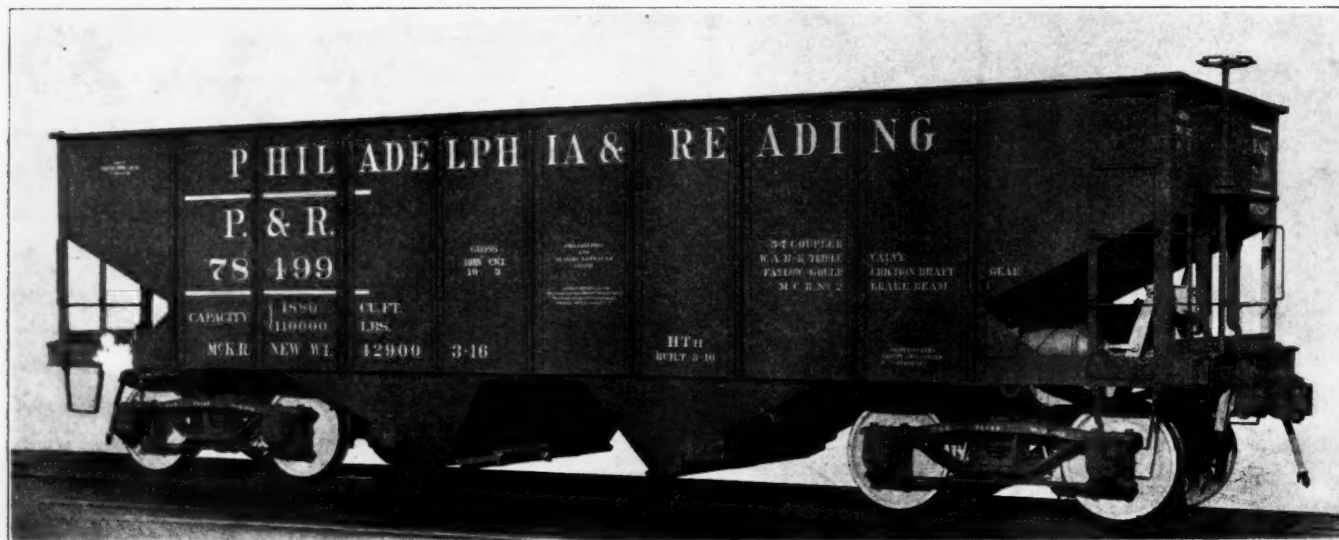
HOPPER CARS FOR THE READING

The Pressed Steel Car Company recently completed an order of 1,000 110,000-lb. capacity hopper cars for the Philadelphia & Reading for use in the anthracite coal traffic and the same builders are at present working on a second order which are to be exact duplicates. The general design of these cars is similar to the railroad company's previous standard

underframe are braced with double diagonal bracing made of angles. One set of these braces extends from the end of the draft sills to the end of the body bolster and the other from the corner of the car to the intersection of the center sills and the body bolster. The body bolster is a single plate girder extending from the floor to the bottom of the center sills, reinforced at the top with a plate and at the bottom with angles extending between the center sills and the sides of the car, and with a continuous plate extending underneath the center sills for practically the whole width of the car. The sheets throughout are $\frac{1}{4}$ -in. thick and the sides are reinforced at the top with a 4-in. by $3\frac{1}{2}$ -in. by $1\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. bulb angle and a 3-in. by 3-in. by $\frac{3}{8}$ -in. angle forms the bottom member. Each side is stiffened with nine vertical stakes pressed from $\frac{1}{4}$ -in. plates. The sides of the car are tied together with four angle braces and are further braced at the center by means of an angle tie strut connected to the cross ridge. The end of the car is stiffened at the top with the same bulb angle section as is used on the sides. The corner posts are 4-in. by 4-in. by $\frac{5}{8}$ -in. angles. The side sill is a short member extending from the end sill to the bolster and consists of an 8-in. rolled channel.

The end construction used on previous Philadelphia & Reading hopper cars consists of a much heavier construction; the rolled channel member is larger and is reinforced with a heavy steel casting and the side sills are heavy channels, extending from end sill to end sill, but it is found that the present construction which gives a considerable saving in weight, meets all the requirements and that very little, if any, is saved in repairs by resorting to the extra heavy construction for these members.

The cars are equipped with Dunham door gear, Westing-



Philadelphia & Reading Hopper Car of 110,000 lb. Capacity

house air brakes, and Gould friction draft gear with Farlow two-key attachment. The trucks are of the rigid pressed steel diamond arch bar type, having 12-in. 35-lb. rolled channel transoms with pressed steel pan-shaped braces at the ends riveted between the top and bottom arch bars and the transom channels. The transoms support the hangers, made of 11-in. by $\frac{5}{8}$ -in. material, on which the springs rest, supporting a short cast steel truck bolster. The top arch bar is pressed from a $\frac{1}{2}$ -in. plate and in addition to forming the compression member of the truck is shaped to form diagonal bracing between transoms and arch bars which keeps the truck square. The bottom arch bars are 7-in. by 1-in. in section and the tie bar is a straight member formed of 7-in. by $\frac{5}{8}$ -in. material with a spacer between it and the bottom arch bar.

The general dimensions of these cars are as follows:

Length inside	32 ft. 10 $\frac{1}{4}$ in.
Width inside	9 ft. 5 $\frac{1}{2}$ in.
Length over striking plates	34 ft. 7 in.
Width over all	10 ft. 0 $\frac{3}{4}$ in.
Height from rail to top of sides	10 ft. 0 in.
Distance from center to center of trucks	24 ft. 0 in.
Weight	42,900 lb.

The capacity of the car level full is 1,880 cu. ft. The center sills are 15-in. 40-lb. rolled channels, placed with the flanges turned in and to these in front of the body bolsters are spliced $\frac{3}{8}$ -in. thick pressed steel draft sills. The end sills are 8-in. rolled channels, reinforced at the top with a flanged cover plate $\frac{1}{4}$ -in. thick. The coupler opening is reinforced with a heavy cast steel striking plate. The corners of the car in the

The First Tentative Valuation Reports

Some of the More Important Contentions of the Government and the Attitude of the Carriers Concerning Them

AFTER two and one half years of work the Federal valuation forces have completed tentative reports on the properties of the Texas Midland, the Atlanta, Birmingham & Atlantic, the Norfolk Southern and the Kansas City Southern. The report on the Texas Midland was discussed in a conference between the Federal valuation board, the representatives of the state commissions and the members of the carriers' committees on May 26. The reports on the other three roads were discussed at similar conferences on June 19 to 22 inclusive. At the conclusion of these conferences Director Prouty stated that these and other reports would soon be sent to the Interstate Commerce Commission and that, when they were put into the form approved by the Commission, the carrier would be notified at public hearings which would probably be fixed for some date early in October.

As these tentative reports are the first that have been issued they give the first opportunity to ascertain the attitude of the government on a number of points of vital importance to the railways. For this reason they are of special interest as they forecast to a large extent the position which the government may take on the valuation of the other carriers as this work develops. The President's Conference Committee, representing the railways, is keeping closely in touch with these developments for the carriers, and has prepared memoranda pointing out the more important details in which the roads take issue with the decisions of the government. An abstract of the position of the committee on some of the points follows:

THE TEXAS MIDLAND.

The Texas Midland operates 124.61 miles of line between Paris, Tex., and Ennis, of which 110.64 miles is owned and 13.97 miles is operated under trackage rights. Portions of the line were built in 1882, 1883 and 1884 after which dates various extensions were added until 1896 when it was completed. It is divided physically into two distinct parts by a section operated under trackage rights over the St. Louis Southwestern between Commerce, Tex., and Greenville.

The government has estimated that construction would be undertaken at both ends of the line and at four intermediate points where other lines cross the Texas Midland and that the construction period from the beginning of the reconnaissance surveys to the placing of the road in service would require about 18 months. The western group committee representing the railway points out that the separation of the line into two distinct parts together with the various physical conditions encountered preclude the development of an economical construction program. Also the saving of a thousand dollars in engineering surveys may result in the unnecessary expenditure of large amounts later by the carriers. The committee has carefully prepared a program of construction in which it allows 4 months for the making of the reconnaissance and preliminary surveys and estimates, 8 months for the final location surveys and estimates and 18 months for the actual construction of the line or a total period of 30 months, one year longer than that estimated by the government. In support of this contention the carriers submitted information showing the length of time actually required in the building of eight other lines in the southwest after all surveys were completed by carriers having organizations already in existence, these periods ranging from 15 to 24 months and averaging 19 months. To complete the line within the period of 18 months estimated by the government

would require an organization of engineering and construction forces materially greater than would be considered good practice in actual work.

The representatives of the carriers also take exceptions to the unit prices for materials allowed by the government, many of which are contract prices. They call attention to the fact that contract prices as for grading do not reflect the entire unit cost of construction, as they do not cover the extras and miscellaneous items such as the transportation of men, outfits and materials for which allowance must be made. The carriers' committee has gone to considerable expense to ascertain the amount of this figure and submitted data for over 96,000,000 cu. yd. of earth work moved in the construction of lines in northern Texas, western Louisiana and Oklahoma which may be assumed as typical of Texas Midland conditions for which the additional cost above the contract price averaged about 4 cents per cu. yd. or a total for the entire amount of almost \$4,000,000.

The government allowed \$496 per mile of road or approximately 2.1 per cent of all accounts for engineering expenses. Eliminating items of inspection which should be assigned to individual structures, this percentage is reduced to 1.86. The carriers presented a considerable amount of data in support of their claim for an allowance of 5 per cent, including detailed costs for 14 different lines aggregating over 1,150 miles on which the engineering cost averaged \$989 per mile or 4.2 per cent.

It was assumed in the government report that all material for culverts and small bridges was hauled to the site by teams and that their erection was completed in advance of the track laying. Upon this basis the pile trestles were valued at approximately \$11.75 per lineal ft., or less than the costs reported by carriers who have constructed similar bridges on lines already in existence where no such hauling was required and where the roads possessed every facility for economical and rapid construction. Attention was called to the fact that the actual cost of replacing a bridge 84 ft. long burned out on an operated line on the Texas Midland in 1915 was \$16.55 per lineal ft. Particularly in view of the fact that 78 per cent of the piling on the Texas Midland is bois d'arc and 22 per cent creosoted pine and that 37 per cent of the caps are bois d'arc (a timber no longer obtainable in suitable sizes at any price), it is maintained that unit prices should be applied to the material in these bridges to bring their new value up to at least \$16 per lineal ft.

In many other instances the unit prices are claimed to be low. Concrete in foundations was estimated at \$11.30 per cu. yd. and in pier work at \$9.10. A considerable amount of data was presented by the carriers showing considerably higher average figures in support of their contention that unit prices at not less than \$11.00 per yd. should be allowed for culvert work and \$15.00 per yd. for concrete in piers. Similarly, burnettized ties were estimated as 56 cents, although they actually cost the company 78 cents delivered. The prices for sand and cinder ballast did not include any costs other than those of loading, and the assumption was made that all cinders originated at Terrell in spite of the fact that in assuming the cost of reproduction new the railway is not supposed to be in existence, and cinders and sand would have to be procured from outside sources at market prices.

The railway uses for transportation purposes 1,862.52 acres of land of a present value of \$236,689.65, of which

162.47 acres of urban land represents a value of \$113,226.90 and 1,700.05 acres of rural land a value of \$123,462.75. The company also owns 75.87 acres of land which it does not use for carrier purposes. The carriers criticize the methods followed by the government forces in arriving at these values, claiming that they did not carry out the requirements of the law. They point out that the methods employed by the land section of the valuation board omit the consideration of damages to the adjoining property, the cost of removal and relocation of buildings, payments for relinquishments of cattle passes and other rights abstracts, arbitrator's fees and expenses in condemnation cases, commissions paid, and other charges properly assignable to this account as a part of the cost of acquisition of the property. They also criticize the methods of the government in not utilizing the experience of the railways in the acquisition of right of way and terminal lines in arriving at their values, and urge co-operation in the securing of data in order that the government may have at its disposal the maximum amount of information to assist it in arriving at the fair value.

THE ATLANTA, BIRMINGHAM & ATLANTIC

The report of the government forces on the valuation of the property of the Atlanta, Birmingham & Atlantic is similar in general to that on the Texas Midland. However, largely because of different local conditions, the report varies in a number of interesting points.

This road consists of 623.6 miles of line in Georgia and Alabama, and extends from Brunswick, Ga., to Birmingham and Atlanta with several branches. A large portion of its mileage was constructed primarily for the development of the lumber industry and these short lines were later consolidated into the present system. The lines were therefore built to low standards and had not been maintained to a high grade until recent years.

In estimating the cost of reproduction the government assumes a construction period of three years. Because of the rainy season which lasts about four months in each year, with a total annual precipitation of 45 to 55 in., and also as the line lies to a considerable extent in low marshy ground, the carriers maintain that this period is too short and that the time allowed for the completion of the line west of Montezuma should be five years, and east of that point not less than three years.

As it has been agreed that all of the property in existence at the date of valuation shall be inventoried, the carriers call attention to many omissions in this report. Among these are contingencies, proper interest during construction, cost of borrow pits, freight on ties, ballast and other material, assessments for public improvements, etc. Also, although much of the adjacent land has been cleared since the original line was built, the clearing and grubbing estimates were based on the present character of the land adjoining the right of way, thereby ignoring a large amount of this work which it was originally necessary to do.

As in the Texas Midland valuation, the allowance for engineering is considered too low, being placed at 2.5 per cent, while the carriers maintain this should be at least 5 per cent. The allowance for the one tunnel on the line is less than the actual original cost, although the labor at the time the road was built was cheaper than at present.

The Atlanta, Birmingham & Atlantic owns 507.6 miles of telegraph line, which is leased to the Western Union with a provision for the use of a portion of it for railroad purposes. Because this line was leased to the Western Union the government eliminated it from the railway inventory. The carriers maintain that as the railway has made the investment in this line it is entitled to the valuation, particularly as it will probably not be included in the Western Union valuation because not owned by that company.

In a separate report W. G. Brantley, counsel for the

southern group of railways, takes issue with the government charges to depreciation, citing numerous examples tending to prove that the true definition of depreciation is a loss in service value, rather than a loss in worth. He argues that the valuation law must be construed in the light of the economic fact that there is a "normal service condition" for every railroad, and that the depreciation required to be shown is the departure from this "normal service condition." Although this property has been depreciated approximately \$5,000,000 in the report there is nothing to show that it has lost any of its "capacity for service," or that if it is properly maintained it is not in a condition to perform all the service required of it. The track was estimated by the government to be in 76 per cent. condition and the ties in 57 per cent condition. The life of the rail west of Fitzgerald was assumed to be 18 years, and east of Fitzgerald 25 years, and it was depreciated accordingly. Relay rail was given a normal life of 50 years. Other track materials were found to be in 70 per cent condition.

THE NORFOLK SOUTHERN.

The Norfolk Southern operates 901.8 miles of line, 788.6 miles of which are owned, 107.8 miles leased, and 5.34 miles included in trackage rights. The lines extend from Norfolk south to Beaufort, N. C., and west to Charlotte. Most of them were built between 1881 and 1903 with two additional sections built in 1913 and 1914.

F. L. Nicholson, chief engineer, has taken exception to a number of the rulings in the valuation report in a pamphlet issued by the carriers. He believes that the two years allowed for construction is too short and that this should be not less than four years after the completion of the reconnaissance and location surveys. The government report states that the prices for grading were based on construction costs on this and similar lines for work done several years ago. Since that time labor has risen in cost and teams likewise. As a result, the present cost of this work is materially higher. Also, a number of the contractors who bid on the work on this line handled it at a loss as the actual cost was greater than the amount they received. Likewise, the quantities obtained by measurement were not sufficient to cover the actual amount of material used.

The allowance made for loss and waste of track spikes, bolts, nut locks, etc., is considered too low, Mr. Nicholson indicating that an allowance of 10 per cent for spikes, 5 per cent for nut locks, 3 per cent for angle bars, 5 per cent for tie plates and bolts and 1 per cent for rails is closely accurate. As on the Texas Midland, cinder ballast is largely used, and in an estimate of the cost of reproduction it would be necessary to place the cost of this material at least 60 cents per yard, as compared with the allowance of 25 cents per yard fixed by the government. Similar exception was taken to the prices allowed for other ballast material.

In ascertaining the land values representatives of the carriers checked all of the quantities for rural and urban land, in many instances examining the same records as the representatives of the government. In spite of this the government reports 938 less acres of land owned by the road than the representatives of the carriers reported, with a total value of \$2,920,007.65.

In treating the interest during construction the Government allows 6 per cent for one-half the construction period, whereas the carriers maintain that this should be allowed for a much longer period as the money must be secured in advance, and it is considered good policy to provide funds for at least one year in advance of the actual work.

In treating depreciation the Government depreciated ties 50 per cent and new rails as much as 56 per cent, figures to which the carrier objects. The road also objects to depreciating track laying and surfacing, allowing only 77 per cent of the total cost for this account.

European and American Tidewater Coal Docks

A Description and Comparison of the Terminals Used
Here and Abroad for the Transfer from Cars to Ships

By J. F. Springer

Coal Tips at King's Dock, Swansea, Wales.

THE principal American tidewater terminals for the shipment of coal are located at the harbors of New York, Philadelphia, Baltimore, Hampton Roads and Charleston. All other coal terminals of importance are either mainly for the reception of coal coming in by water (as at Boston) or are located on the fresh water of the Great Lakes. An analysis of the practice of handling coal at these five Atlantic harbors will accordingly suffice when making a comparison of the tidewater coal shipping facilities of America and Europe.

On the European side, there is a limitation on the locations of harbors for coal shipments by the broad consideration that England, Wales and Germany are the only considerable producers. While their combined production is but little more than that of the United States, their total shipments are considerably higher.

The character of the business at the five American harbors varies with the location. At New York, coal delivered to vessels for other than local consumption consists mainly of anthracite going to New England points and of bituminous coal loaded on vessels as bunker coal. The equipment of the harbor is naturally determined by these considerations. Of the 13 ports and 29 coaling plants on the waterfront, only a very few are equipped with modern handling plants. There is, in fact, but little to be learned at New York that may not be learned just as well elsewhere on the Atlantic Coast. A similar remark applies to Philadelphia. It is the southern harbors which already have or are installing notable coal handling apparatus.

Before leaving the older piers, however, it may be well to call attention to a few further details as to their mode of operation; especially since these piers handle a very large percentage of coal. The elevation at the sea end varies from 5 ft. for certain New York piers to 70 ft. for a moderately old pier at Lamberts Point, Hampton Roads. If the deck of the pier is above grade, the cars are placed on it either by locomotives hauling them up an incline or by the use of an inclined cable operated by power. In some cases, the cars are handled onto the pier by means of a locomotive; in others, the deck makes a gentle dip seaward and the cars

move along by gravity. Where the local conditions are favorable, these piers would seem to be efficient and economical. When they have decks much above the grade of the railroad, a locomotive incline will of course require space. The power incline enables a steeper grade to be employed and so economizes on room.

FUNDAMENTAL REQUIREMENTS

There are three principal movements that usually have to be effected to get coal from the grade of the track into the hold of the vessel. First, there must be longitudinal transportation to points alongside the hatchways. Then there must be a vertical movement to get the coal as high as or higher than the hatchways. Third, there must be an outboard movement to get the coal over the hatch openings. The longitudinal movement is perhaps the most difficult one to secure economically and simply. It is possibly not too much to say that the method adopted controls the general design of nearly the whole equipment. Thus, if it is decided to get the coal out from the face of the pier by a gravity chute, there must be sufficient elevation of the head of the chute above the hatchway to provide for it. This results ordinarily in the requirement for an elevated pier deck. This in turn requires a means for elevating the coal.

The most notable modern coal piers on the Atlantic coast whose design has been thus controlled by the gravity chute are the three big steel structures at Hampton Roads, operated by the Virginian, the Chesapeake & Ohio and the Norfolk & Western, respectively. The pier decks are greatly elevated. That of the Virginian pier is 70 ft. above the water, while the decks of the others are about 90 ft. above sea level. These great heights are needed to provide for gravity dumping from the cars into the pockets or bins in the superstructure and for the gravity delivery by chute out to the hatchway and to positions in the hold. The hatch openings are materially elevated on some vessels, especially when the vessel is in an unloaded condition.

CONVEYOR BOOMS RECENTLY INTRODUCED

A departure from the gravity chute method for getting coal outboard from the pier has been used in the new coal

dock of the Southern at Charleston and will be employed in the new Baltimore & Ohio pier at Curtis Bay, Baltimore. At Charleston, the coal is moved outboard by a scraper conveyor carried by a movable curved boom. The coal is shoved along. At Baltimore, a belt conveyor will carry the coal out from the face of the pier. This single change in method permits both piers to be comparatively low structures.

The method of delivering coal to the outboard conveyor affects the design. At Charleston, gravity is depended upon for this, a receiving hopper being placed above the inner end of the conveyor boom. This hopper receives coal from the car dumper which moves along back of the loading tower containing the receiving hopper upon a more elevated track. At Baltimore, the outboard conveyor receives coal which is brought to the loading tower upon another belt conveyor. In the one case we have two movable tower-like structures; in the other but one. Charleston has the only example on the coast of a car dumper moving along on the pier. In all the other cases the dumper is a fixed piece of apparatus. The new Baltimore pier will have two dumpers, both to the rear of the pier.

A point in which there is general agreement in car dumper design along the American coast is that cars are dumped sideways. This seems to be the prevalent American practice.

The object of the car dumper at the southern piers is to get the coal out of the railroad cars preliminary to getting it out onto the pier. The exception is at Charleston. At Hampton Roads, the coal is dumped into other and special cars which are only used on the pier. At Baltimore, the coal passes from the dumper to a short belt conveyor which feeds the main belt conveyor.

As to vertical movement, at Baltimore, there is to be little or none, so this factor is eliminated; at Charleston, there is



Barney Pushing the Loaded Car into Position, Lehigh Valley Dock, Perth Amboy, N. J.

practically none, since the railroad cars are run out onto the pier into the cradle of the dumper by a locomotive; at Hampton Roads it is great. At this harbor, particularly at the Norfolk & Western and the Chesapeake & Ohio piers, the special pier cars, after receiving their loads from the dumpers, go to elevators which lift both the car and load vertically to the pier deck. Getting the horizontal movement out onto the pier is accomplished at Hampton Roads by moving the pier cars under their own power, at Baltimore by a big belt conveyor and at Charleston by an ordinary locomotive.

BRITISH COAL TERMINALS

One of the principal coal fields of the British Isles is located on the northeastern coast of England in the counties of Northumberland and Durham. The rivers Tyne and Wear flow through this district and afford means of contact with salt water transportation, especially at their mouths. Within the last few years, a number of installations of coal handling facilities have been made at Tyne Dock and at Sunderland. Tyne Dock, located on the southern bank of the Tyne river, is owned by the North-Eastern Railway and is one of the greatest coal handling ports in the world. A



Middlesbrough Dock, North-Eastern Railway of England

typical pier is operated about as follows: The loaded railway coal cars are brought to the shore end of the pier and are started down along or near the main axis of the deck under gravity until the sea end is about reached when they return upon a reversed grade. The discharge of the loads is made upon the return, the cars now being on a track near the side. This method is essentially similar to certain American piers on the Atlantic coast in that gravity is relied on to get the cars out onto the pier and back again. At Tyne Dock arrangements were satisfactory enough until the 10-ton coal cars began to be replaced by cars of 20-ton capacity. It was found that in bad or cold weather the incline was insufficient to secure the start with certainty. Accordingly, several years ago two big hoisting engines were installed beneath the tracks of the big piers to provide a means of operating the larger cars. Either one does the work of four capstans.

The amount of handling performed at the four piers of Tyne Dock is enormous, despite the diminutive cars. In the first quarter of 1914, as much as 2,000,000 tons were shipped from this dock. A large day's work occurred on March 27, 1914, when 37,395 tons were shipped. One of the four piers is equipped with electrically operated conveyors with a capacity of 400 to 500 tons per hour each.

A more important matter is the new station which was authorized early in 1914 by the North-Eastern Railway

which will add to the already great capacity of Tyne Dock. Here two fixed hoists are to be installed upon one end of a great quay. The loaded railway cars will be pushed up a grade of 1 in 75 and allowed to make return by gravity to the hoists. Here the coal may be elevated to points 60 and 65 feet above high water, which is 15 feet above low water.

The hoists in British practice usually take the cars up to considerable heights. At Tyne Dock the new hoists are to despatch the empty cars upon their return at high level and they will run off over an elevated viaduct. Here is a point of difference between practice in the two countries. At the



Side View of New Pennsylvania Car Dumper at Philadelphia, in Action

Pennsylvania dock at Philadelphia, the empty car is returned to precisely the same level from which it started. At Tyne Dock, the coal is discharged from the cars through the bottom, the coal passing into a suitable hopper. Thence it travels by the conveyor out to the hatchway.

At Sunderland, on the Wear river, a short distance to the south of the Tyne river and Tyne Dock, a rather remarkable system of coal handling has been introduced. The requirements to be met are severe. It was desired to deliver a very friable soft coal—softer than steam and gas coals—to small coastwise steamers having cargo capacities varying from 250 to 1,500 tons. A very flexible method of delivery was required because of the variations in the width and depth of holds. The desire to avoid breakage was perhaps the hardest condition to meet. The solution took advantage of the fact that the coal cars to be dealt with had capacities of only $10\frac{1}{2}$ and 12 tons. In short, it was decided to handle the car and its load together and to do the dumping in the immediate vicinity of the final resting place in the ship's hold. The cars are run out onto a kind of cradle at the end of the pier. The cradle with its load is swung forward and downward. The car remains horizontal, or nearly so, and a method of braking is employed to stop the movement when the desired position for discharging the load of coal is reached. The coal is then discharged, when the whole contrivance returns to its upper position.

The loaded cars go onto the cradle, when the latter is at the pier-level position, under the influence of gravity. So also, upon their return, the empty cars run off by gravity on a decline of 1 in 30. Car-locks automatically come into play immediately when the loaded car comes upon the cradle to prevent it from running back again. The cradle and cradle locks are protected from the shock of the stoppage of the car by a system of shock absorbers and the deflection of the shock to the fixed framework of the pier.

It will be noted that this handling device normally operates without power. The procedure of discharging the coal from the car from a level immediately over the pile in the hold is a notable advance in connection with the prevention of breakage. If this system is applicable to American conditions, it is probably the best thing in sight. The difficulties of using it here would seem to focus not on the great weight of a loaded American coal car, but upon its bulk relative to the size of the hatch openings.

The British device operating at Sunderland can handle one $10\frac{1}{2}$ -ton car per minute. The average speed for an hour is about 500 tons.

THE SOUTH WALES DISTRICT

The South Wales coal district is one of the most important in the world. Three of the principal outlets are at Cardiff, Barry and Swansea. Enormous tonnages of coal are transferred from rail to ship at these points.

At Barry docks a group of five coal tips are in process of



One of the Three Fixed Hoists at Barry Dock, South Wales

installation, one of which had been installed last September. They may be taken as representative of advanced British practice. In the first place, the numerous operations are performed hydraulically. It should be said, however, that British practice is going over more and more to electricity. This is doubtless owing to the economy and extreme facility with which electric power may be distributed to widely separated points.

Two out of the five tips are movable along the face of the

dock; the remainder are fixed. The several capacities are about 800 tons per hour each. While the average car carries a load of 10 or 12 tons, the tips are capable of handling cars of 20 tons capacity. The maximum elevation for discharging is about the same as the deck level of the Curtis Bay pier at Baltimore—that is, 59 ft. At Barry, however, the elevation is measured from the land surface. The 800-ton capacity is based on the 59-ft. elevation. Two hydraulic rams are connected with the elevating mechanism, one having a diameter of $16\frac{1}{4}$ in. and the other of $10\frac{1}{4}$. Provision is thus made for handling big or little loads without waste of power. The counterbalancing of the weight of the cradle is provided for by still another ram, and it, too, is indirectly connected with the cradle.

The tilting of the tipping table is secured by means of another $14\frac{1}{2}$ -in. ram, located on the cradle. When extended to its full stroke, the ram tilts the table and car to an angle of 45 deg.

Two cranes mounted near the top of the tower have booms which reach out about 35 ft. One of these cranes has a capacity of 5 tons and is employed to handle a specially designed type of anti-breakage boxes whose purpose is the careful handling of coal. The other and smaller crane has the duty of lifting small coal from the vessel's deck and discharging it through a hopper into a truck. Both cranes are hydraulically operated.

An apron chute is movably arranged on the front of the tower and when set at the usual angle the apron extends out 20 ft. The angle may be varied, as well as the elevation of the whole chute. Also, it is possible to swing the chute through a horizontal arc of 23 deg. The reach of the chute may be increased by the use of extension pieces. The movements of the chute are effected through four lines attached to the outer and inner pair of corners. These lines are connected to four independent hydraulic engines. The independence of operation of the four provides for the great variety of positions possible for the chute.

AMERICAN AND ENGLISH PRACTICE COMPARED

A most notable difference between American and British practice in the design of car tipping or dumping plants relates to the management of the lifting operation. In the United States, the approved practice is to divide the lift into two parts; in British practice, it is left substantially undivided. That is to say, in the American plants, the loaded car is in effect lifted part way by a pushing apparatus—a barney or mule operated by cable pushing the car up an incline. The second step is from the bottom of the dumper to the dumping level and is accomplished of course by the dumper itself. A typical British procedure requires the loaded car to enter the lower part of the hoist and go upon the cradle at the general level. The hoist then elevates to the dumping point at a single operation. There is no cable-operated barney or similar device. When the "empty" descends it may be run off over an elevated track before the cradle gets quite to the bottom.

If the American plant is properly designed, the barney-incline will be so related to the hoisting and dumping arrangements that a cycle of operations with the one will occupy just about the same length of time as a cycle with the other. When this is the case, the joint operation of the two enables the whole plant to handle perhaps half again as many cars as would be the case if the hoist had to perform the whole lift. The hoist is, in fact, operating with a reduced lift. Accordingly, it can handle more cars than with a full lift, provided it is not kept waiting for fresh cars. When the incline arrangements are suitably adjusted, there will be little or no wait. With the British system, the hoist must make a complete lift from the lowest level and return before it is ready to begin with a second car.

SHRINKAGE OF BOX CAR SHEATHING

Several roads which are extensive users of single-sheathed outside steel frame box cars have had difficulty due to the shrinkage of the sheathing after it is placed on the cars and the cars are in service. This was due to insufficient drying of the lumber before application. The slotted holes generally used to take care of adjustments for overcoming the effects of such shrinkage provide only $\frac{5}{8}$ -in. or $\frac{3}{4}$ -in. which is entirely inadequate when we consider that in one order of automobile cars there was a shrinkage in a height of 10 ft. of from $5\frac{1}{2}$ in. to $7\frac{1}{2}$ in. These cars were built without specification being made as to the dryness of the lumber and in the next order of cars special care was taken to provide well dried lumber. Samples measuring approximately $1\frac{1}{2}$ in. by 5 in. by 12 in. were placed for a period of 96 consecutive hours in a hot cupboard, the temperature being maintained at from 160 deg. F. to 180 deg. F. Any of the tested pieces which showed a reduction in weight of more than 6 per cent were considered improperly dried. It was found, however, that the long period of drying was inconvenient and very short samples of the same lumber were tested in various ways to determine on the shortest practicable time of drying.

As a result of these tests the specifications for dryness required all samples to be taken from the middle portion of the stick. These samples are from $\frac{1}{4}$ in. to $\frac{5}{16}$ in. long and are dried for two hours in a hot cupboard at the temperature previously used. A shrinkage of more than $\frac{1}{16}$ in. in a width of $3\frac{1}{4}$ in. is taken as indication that the lumber is improperly dried. The cars as built under the first method referred to have proved entirely satisfactory, and, while no cars have as yet been built to the second specification, officers of the railway which has developed this method feel confident that it will give as good results as the previous specification.

DETERMINATION OF EFFICIENCY IN THE SUPPLY DEPARTMENT*

By H. C. Pearce

General Purchasing Agent, Seaboard Air Line, Norfolk, Va.

The broad answer to the question of how the efficiency of the supply department can be determined, would be by the results obtained from the operation of the property. This answer is not sufficient, however, for the executive who wants to know whether he is getting the fullest efficiency from this department, or to the officer who is conscientiously striving to place this work on an efficient basis. They must have some way of knowing how their work compares with the work of others.

Few experienced and honest supply officers are satisfied that they are now getting the best results possible, or that they are being properly measured and compared. The trouble will be found rather with the fundamentals than with the details. In order to refine an organization, it must be sound fundamentally. The organization that develops and exposes mistakes is much more to be desired than one that hides them; black shows plainest on white, and the better the organization, the more plainly will the defects be seen and remedied.

The first fundamental principle to understand is the purpose. The purpose of the supply department is primarily to provide material of proper quality when and where it is needed, for the *lowest net cost*. You will notice I mention the lowest net cost, which means that the handling of the salvage should be as much a part of an efficient supply department as the purchase and care of the material.

*A paper read before the Richmond Railroad Club, Richmond, Va., April 10, 1916.

Having the real purpose of the supply department understood, the next in order is the organization. The organization must be broad enough and flexible enough to meet all conditions. What does this mean? Sufficient help and facilities to provide, inspect, care for and account for all unapplied material at all times. The supply department should be required to follow the material from the time its need is determined until its issue for use and the disposal of salvage. This means that the organization must be such that it can determine accurately what is needed before it is bought; purchase at the best market prices; inspect to see that you receive what you buy, and store in such a way that it can be located almost instantly for use or check.

Expensive buildings are not necessary. Plenty of room, protection from the elements and facilities for handling quickly and economically, are much more important.

The question will at once be asked: What will it cost to do all this? The broad answer to this question is, no more than it is now costing, provided it is being done.

What does it cost to provide material (commonly called cost of handling)? I have read in technical papers, and I have heard supply officers state, that it was costing them less than one per cent. Some admit it is costing them five per cent, and many executives actually believe they are making a substantial profit when they supply material to other lines and companies at cost, plus ten per cent.

I recall a personal experience that is a fair example of the lack of knowledge regarding this subject up to a few years ago. The chief operating officer of a system of several thousand miles of railway advised the chief operating officer of the property on which I was employed that the stores department on his system was being operated very satisfactorily at a cost of \$1,400 per month. I was requested to accompany our executive's assistant to make an inspection of the organization to learn how it was done. An investigation of the facts on the ground developed that the \$1,400 represented the office force and two counter attendants at the general stores. All the balance of the work was being done by employees of other departments at a nominal monthly charge. A check of the men on the ground actually handling material developed the cost of the work to be not less than \$10,000 per month, and, when a short time later, a reorganization was effected, and the work was taken over by the supply department, I was advised by the general storekeeper that he had taken over labor from other departments amounting to a little less than \$11,000 per month.

Speaking of so-called "Store Expense," or handling charges, which is usually added to bills against other companies, which represents the cost of providing material; years ago I was employed on a railway in the Northwest that had a trackage agreement between two large cities. This agreement was based on a flat rental, the lines using this track paying for the cost of operation on a wheelage basis. One of my duties was to check these bills. They were a marvel of thoroughness of detail. They started in with charging every possible item of labor and material that could be used in the maintenance and operation of this track. To this was added a proportion of the wages of the division roadmaster and the superintendent, and their staffs. To this was added a flat charge of 25 per cent. The man whom I succeeded in checking these bills went to the railway that owned the tracks as the maker of the bills, and I assure you he did not overlook charging anything. He made it his business. It was my business to see that we were not charged with anything we did not get. He had the best of me in that after he had charged everything that he could locate, he then prorated everything which he could not locate and then added a flat 25 per cent for handling charges and what had been overlooked. He afterwards became comptroller of the property, which is one of the largest and best operated in the West, and I shall always consider these bills as models of

thoroughness, and more clearly representing the actual cost for materials furnished joint facilities than any I have ever seen since.

Few railroads know what it actually does cost to provide materials, but one thing is certain, it costs less to do a thing well and in a systematic and orderly manner than it does to do it in a haphazard manner by those who are not directly interested or responsible. The cost of buying, inspecting, handling and accounting under a well organized plan is not less than five per cent. This does not include interest on investment, taxes, insurance, company haul, maintenance of buildings and depreciation, and obsolescence of stock. As a matter of fact, the actual cost of handling is the least important item of expense, the real loss being in depreciation, obsolescence and interest on investment. A well-known expert recently compiled some statistics in which he places the loss by depreciation and obsolescence at 12 per cent.

The question really is, how many of our supply departments are doing the work they are organized to do, and how can they determine the result of their work? The following are some of the visible signs:

- (1) Perfect system and order at all times, and the material arranged in such a way that an actual inventory by unit of quantity can be taken in one working day. Otherwise, it is not in a safe condition to base a purchase on.
- (2) Material carefully inspected and compared by practical men. Otherwise you cannot know that you are receiving what you pay for, or what is most suitable for the purpose for which it is ordered.
- (3) Broadening of the market by inviting and encouraging competition. Otherwise you are not getting the lowest market prices.
- (4) The material delivered to the workmen in the shops and on the line. Otherwise you cannot know what is needed.
- (5) A practical and thorough system of recovery and reclamation of the salvage. Otherwise you do not know what material is not giving its guaranteed service.
- (6) Receipt and issue of all material. Otherwise you cannot control your material balance.

The following statistics will, so far as such things can, give a good indication:

CONTROL OF STOCK

- (1) An annual classified inventory of all unapplied material and salvage on hand, taken by the supply department under the supervision of the accounting department.
- (2) Monthly classified statement of material on hand.
- (3) Ratio of materials and supplies to labor.
- (4) Ratio of materials and supplies to miles of track.
- (5) Ratio of materials and supplies to operating expenses.
- (6) Ratio of materials and supplies to current assets.

CONTROL OF PURCHASES

- (1) Monthly classified statement of purchases.
- (2) Monthly percentage of purchases to issues.

If you are doing all these things, and more, you may be fairly certain that the results will be satisfactory, and that the statistics will correctly reflect them.

There are undoubtedly many millions invested in materials and supplies on our railways that should not have been purchased. Some recent tabulations compiled from Interstate Commerce Commission reports as of June 30, 1914, indicate that 1¼ per cent of the total current assets of the railways in the United States is represented by materials and supplies, and that the ratio of stock maintained to operating expense is 12½ per cent.

Under present conditions, it is impossible to determine what the actual amount of unapplied material is on most of our railways, because the stock balances represent only a part of the material on hand. Storekeepers, and others, are commended for reducing their stock balances. Their efforts are therefore naturally concentrated in relieving their stocks of the material, instead of conserving it. A large portion of the material on our railways really originates with maintenance officers. This is particularly true of specialties and

material to protect against possible emergencies and accidents. When this material is received, the storekeeper naturally insists on having it drawn in order to relieve his stock. The officer who is responsible for the requisition is obliged to draw it in order to prevent criticism of himself. Until some thorough plan is installed, having for its purpose the taking of an accurate inventory of every dollar's worth of unapplied material, regardless of whether it has been charged out or not, there can be no honest comparison of stocks.

The plan in effect on some of our railways, of having the accounting department supervise the taking of the annual inventory, is sound. Materials and supplies are as much a part of the current assets of a railway as its cash and bills receivable. One of the causes for the enormous amount of material on our railways is the mistaken policy of always having enough. No individual or corporation can be truly economical or efficient and have everything they want.

I recall the answer of a well-known mechanical officer when his attention was called to a quantity of material that had been on hand for years. He admitted that the material had not moved for ten or fifteen years, and he did not know that it ever would. He hoped they never would need it and said that the company would be making money if they did not. His idea of economy and efficiency consisted merely in the fact that there should always be material enough of every kind on hand to meet every possible emergency or demand, never taking into consideration for a moment that the company's money had been expended for the material, that it had been drawing interest, and that it would eventually become obsolete. The fact that the material had not been charged out to his expense was to him sufficient. This can be stated in a broad way to be the general view of a great many capable and experienced maintenance officers.

It is common practice for master mechanics, shop superintendents, foremen, etc., to hold staff meetings to prepare weekly or monthly lists of material that is delaying work or that they think should be maintained in stock, and it is not unusual for them to go around looking over the material to find something to add to the list. Generally, this is nothing but a fence for excuses.

The policy of encouraging officers and employees to make complaints regarding shortage of material is wrong and has probably done as much as any other one thing to encourage unnecessary investment in materials. Instead of criticism being always aimed at the lack of material, it should rather be aimed at its presence. Instead of men holding meetings to report and complain of shortage of material, their efforts would be better directed towards ways and means of getting along with what they have.

The policy of ordering material long in advance of the actual needs, without taking into consideration all of the things that may happen to postpone, curtail, or even cancel the work, is no doubt the cause of the greatest accumulation and loss of material on our railways. This can only be overcome by a realization and responsibility of our operating and maintenance officers and controlled by the chief executive, by demanding that no material shall be ordered for new work until all the facts have been taken into consideration and the money provided, and he will then require his chief supply officer to so order and arrange the deliveries that as little as possible will be on hand should the plans be changed for any reason; reasoning that it is better to delay work than to have large sums of money tied up in material before it is needed.

What can the supply department hope to accomplish in net results by curtailing its purchases of lantern globes, wicks, cotters and hundreds of similar items of small supplies, and have thousands of dollars tied up in material which may never be used? The saving of pennies will never overcome the loss of dollars.

There still remain the following underlying principles

which must be placed on a proper basis before the efficiency of any supply department can be actually determined, or the net results properly measured.

First: The purpose of the organization must be clearly understood and performed.

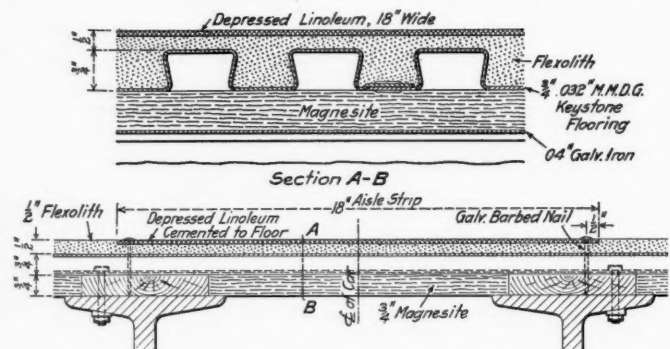
Second: All the work of providing, storing, handling and accounting for material must be done by this department, and the employees carried on its payrolls.

Third: All unapplied material must be carried in the storekeeper's balance, and to ensure its being done, an actual inventory of all material and salvage on hand should be taken annually, and reduced to its current market value, and this work supervised by the accounting department.

The head of the accounting department is responsible to the chief executive for the assets of the company.

DEPRESSED AISLE STRIPS

The Union Pacific is using depressed aisle strips in the floors of its coaches and chair cars. The aisle strip is linoleum, 18 in. wide and set in flush with the top of the Flexolith flooring. It is continuous, extending the full length of the passenger compartment. The linoleum is applied to the flooring with a heavy coat of linseed oil or a suitable cement, and is then securely tacked to the wood stringers over the center sills with small galvanized barbed nails. The linoleum used is $\frac{1}{8}$ in. thick, composed of inlaid alternate red and



Aisle Strip for Coaches and Chair Cars

green blocks, $1 \frac{13}{32}$ in. square or 2 in. diagonal. The blocks are laid diagonally and the strips are cut along the diagonal center line of the red blocks to form the edges for the sides to match the color of the Flexolith flooring. The use of the strips in this way is sanitary and also tends toward safety, as it prevents passengers from tripping over the edges of the strips.

A maroon coloring matter is mixed with the Flexolith flooring compound, eliminating the frequent necessity of repainting floors.

NEW RAILWAY IN AUSTRALIA.—Among the railway lines projected in South Australia is the Long Plains-Port Augusta line. This will be 145 miles in length, will cost \$6,874,000, of which \$358,000 will be for rolling stock. The gage of this line, which will be laid with new 80-lb. rail, will be 5 ft. 3 in.

WOMEN ON GERMAN STATE RAILWAYS.—According to an official report to the Reichstag, 36,000 women are now employed on the German State Railways, and the number is increasing every week. The same official report says that women are employed as ticket collectors, platform porters, laborers, engine cleaners, and grade crossing tenders. Women have not been employed in the place of signalmen nor is there any intention of admitting them to this department of railway work.

General News Department

The Chicago & Alton has made an increase of 1½ cents an hour in the wages of its car shop employees.

In a fire at Boston, July 25, the Boston & Maine lost a dining car and seven day coaches; estimated total loss \$25,000.

An informal business meeting of the executive committee of the Railway Telegraph Superintendents' Association was held on July 26 at the Hotel LaSalle, Chicago.

One of the scale-testing cars of the United States Bureau of Standards arrived in Chicago last week to remain in the vicinity of the city for two or three weeks to test track scales used by the railroads and industries around Chicago.

The Atlantic Coast line, has made an increase, taking effect July 1, of 5 per cent, in the pay of all clerks and other employees at stations who have been in the employ of the company for twelve months or more. About two thousand persons are affected.

It is expected that a portion of the lines of the Southern Pacific of Mexico, which had been taken over by the Mexican authorities, will be returned to the company shortly. The line running from Naco, Ariz., to Cananea, Mex., has already been returned.

The Pennsylvania Railroad reports that, in the first six months of the present year, 92,380,184 passengers were carried on the company's lines without loss of the life of a single one of them in a train accident. This completes two and one-half years in which no passenger has been killed in a train accident on any part of the Pennsylvania System, either east or west of Pittsburgh.

The Baltimore & Ohio, failing to reach an agreement with its telegraphers in conferences over increases in rates of pay and adjustment of working conditions, has joined with J. J. Dermody, fourth vice-president of the telegraphers' brotherhood, in a letter to the United States Board of Mediation, asking its good offices in adjusting the differences. Officers of the road say that the demands of the operators are for a flat increase of 15 per cent, and would mean an increase of approximately \$500,000 yearly. They ask also for a reduction from 10 hours to 9 hours for a day's work in one-trick telegraph offices, from 10 and 9 hours to 8 hours in two-trick offices. They demand that all agents receiving between \$25 and \$125 a month be included in their wage schedule.

Appeal by National Chamber of Commerce

H. A. Wheeler of Chicago, chairman of the National Chamber of Commerce committee on the railroad situation, has sent a letter to President Wilson in part as follows:

"As chairman of the National Chamber committee on the railroad situation, I met in New York with the railway executive advisory committee, Frank Trumbull, chairman, and the national conference committee of railroads, Elisha Lee, chairman, to request from them a definite statement as to the position of the roads when the conference reconvenes to hear the result of the strike vote, which was completed last week.

"There seems to be a prevailing opinion in Washington, and I think rather generally held throughout the country, that no interruption of freight transportation will result and that some means will be found to adjust the differences.

"As a result of the meeting my conviction is deepened that an amicable settlement is remote, and that while other orderly steps are yet to be taken before a final break is reached, yet such a break is inevitable unless strong measures of intervention are speedily introduced.

"On August 8 the joint conference will convene again, the men will announce the result of their strike vote, and the roads will reiterate their proposals, which the brotherhood chiefs have once declined. I am assured that there will be no modification of the attitude of the roads. Neither is it expected that the

representatives of the men, with the new power of the strike vote in their hands, will recede from the position which they have heretofore taken.

"The United States Board of Mediation and Conciliation may come into the matter at this point, but without effect, in my judgment, in bringing these contending factions together. Finally, arbitration may be discussed, and the break will come when the roads absolutely refuse to arbitrate only the demands of the men and the men refuse with equal force to admit into the arbitration the contingent proposals of the roads.

"Thus, unless there is intervention as proposed in Senate joint resolution 145, ratified by an almost unanimous vote of the commercial bodies affiliated with the Chamber of Commerce of the United States, or other governmental intervention on behalf of the public, nothing will be left but for the men indefinitely to defer action or exercise the authority conferred upon them by an overwhelming vote to call a strike.

"In the meeting the roads definitely expressed a determination not to recede from their present position no matter from what source an appeal is made, and while I am usually optimistic about finding a way out of difficult situations, I must confess in this situation, after talking most earnestly with both parties to the controversy, I see no ray of light nor any possibility of averting a serious catastrophe."

New York Central Telegraphers' Pay Increased by Arbitrators

The arbitrators, H. K. Daugherty, W. J. Fripp and E. J. Manion, who, since July 6, have been considering the demands of the telegraphers of the New York Central, and the New York, Chicago & St. Louis, for increased pay, have issued their report, granting increases of 8 per cent on the lines west of Buffalo, and 10 per cent on the lines east. Vacations with pay are allowed to operators who have been in the service two years; and west of Buffalo extra pay is allowed for Sunday work. The operators' request to be relieved of outside work, such as attending crossings and running pumps, was denied.

The chairman of the board of arbitrators is a lawyer of Grove City, Pa.; Mr. Fripp is general manager of the New York Central (East), and Mr. Manion is vice-president of the telegraphers' brotherhood. The award is in three parts, dealing respectively with the Central lines east of Buffalo, the Central lines west of that city, and the New York, Chicago & St. Louis.

East of Buffalo.—The request for seven days' vacation for operators working more than nine hours a day, and in the service one year or more was allowed. The request for fourteen days' vacation for those in the service three years was allowed in part; a ten-day vacation was granted. For operators working nine hours or less the request for seven days' vacation for those two years in the service was allowed; the request for longer vacations for those longer in the service was denied.

The award does not say exactly what rate of pay was demanded by the operators, but the increase, 10 per cent, is said to be considerably less than was asked for.

West of Buffalo.—The request for relief from attending pumps, cleaning batteries and lamps, etc., was denied; but certain rules concerning these matters on the Illinois division, formerly the Chicago, Indiana & Southern, continue in force.

The request for overtime on Sundays is granted. This means that the monthly rate now pays an operator for 26 days a month, approximately, instead of 30 or 31 days. The allowances for vacations are the same as those east of Buffalo. Complying with the request of the operators, the arbitrators add to the schedule eight stations not heretofore included. The increase in the monthly rate of pay (8 per cent) is a little more than half the percentage that was asked for.

New York, Chicago & St. Louis.—On the lines of this company the only request was for extra pay for Sunday work; and this is granted.

Mr. Fripp filed a dissenting opinion concerning Sunday work (as to which the operators east of Buffalo made no request).

Prior to the year 1904 the operators on the Lake Shore & Michigan Southern (now the western lines of the New York Central) were paid extra for Sunday work; in that year this rule was abolished, and the monthly rate was increased so as to equal or exceed the total amount theretofore paid for both week days and Sundays. On both roads the rate has included compensation for Sunday work, and the pay has been raised a number of times since 1904, though on the New York, Chicago & St. Louis no operator was required to work more than six hours on Sunday.

Mr. Fripp says: "It is wholly illogical to grant an increase in wages and a more liberal vacation rule, and at the same time provide for extra payment for Sunday work. . . . The effect of this award in converting what has been recognized as a monthly wage for 30 days, into a monthly wage for 26 days, is to create a penalty for employing men on Sundays." He goes on to show that the telegraphers have argued for vacations because of their continuous service; now, that argument is removed, and yet the vacations are granted.

"The record shows that the rate of wages at present paid on the New York Central west of Buffalo, and the New York, Chicago & St. Louis is higher than on all except two out of thirteen railroads which operate in the same territory, and on none of those roads is any allowance made for overtime on account of work performed on Sunday. The net result of this award is an increase in the rate of pay of the employees affected thereby of over 22 per cent, without taking into consideration the extension of the vacation rule. [For example, \$75 for a month of approximately 30 days, equals about \$2.46 a day. Increasing the monthly rate 8 per cent makes a total of \$81; and this is for 26 days, which makes the daily rate about \$3.11. Thus the increase, per day, 65 cents, equals 26 per cent advance over the former rate of \$2.46.] The wages which the two companies mentioned will be required to pay, under this award, will be greatly in excess of those paid by their competitors for the same services, although the testimony fails to show that there has been any increase in the duties or responsibilities of the telegraphers since the last adjustment of wages was made."

Business Sentiment in Favor of Exclusively Federal Regulation

Business organizations from all over the country have adopted resolutions favoring federal regulation to the exclusion of conflicting state regulation of interstate traffic.

The Railway Business Association suggested this action and put forward the following proposals:

(1) That the national government should, on behalf of the states, regulate instrumentalities of interstate commerce, except in those spheres which are distinctively state.

(2) That Congress, in order to keep regulation close to the people, should create regional sub-commissions, appointed by the President and subordinate to the Interstate Commerce Commission, to conduct administration over areas corresponding to traffic movement.

(3) That Congress, having chosen to leave to private capital the function of providing the people with rail highways, should insure reasonable extensions of such highways into new regions, as well as the improvement of existing roads, by declaring by statute the policy of the government to permit such a system of rates as will yield earnings sufficient to attract investment for new construction.

Bodies from which the Railway Business Association has received resolutions of substantially this tenor are:

National Wholesale Lumber Dealers' Association.
Philadelphia Chamber of Commerce.
American Hardware Manufacturers' Association.
American Supply and Machinery Manufacturers' Association.
National Association of Manufacturers.
Corset Manufacturers' Association.
National Machine Tool Builders' Association.
McKeesport, Pa., Chamber of Commerce.
Southwestern Interstate Coal Operators' Association.
National Leather Shoe Finders' Association.
Southern Pine Association.
American Iron, Steel & Heavy Hardware Association.
Wilmington, Del., Chamber of Commerce.
Wilkes-Barre, Pa., Chamber of Commerce.
New Jersey State Chamber of Commerce.
Hoboken, N. J., Board of Trade.
Wholesale Saddlery Association.
Owego, N. Y., Business Men's League.
Illinois Manufacturers' Association.
New Jersey State Chamber of Commerce.

Manitowoc, Wis., Chamber of Commerce.
Tile Manufacturers' Credit Association.
Nashville, Tenn., Commercial Club.
Ohio Manufacturers' Association.
Manganese Steel Founders' Society.

Signals at Highway Crossings

Pursuant to the action taken at the recent conference in Chicago, reported in the *Railway Age Gazette*, last week, page 157, representatives of the National Association of Railroad Commissioners, and of the American Railway Association, conferred, last week, Friday, in New York City with representatives of the American Automobile Association, in relation to joint action by the three associations concerning the promotion of safety at grade crossings; and it was agreed to ask the American Railway Association to call together a committee of railroad counsel to draft a bill or bills covering the question of regulation of traffic at grade crossings, with a view to the prevention of accidents. These drafts will be submitted to the Public Service Commissions of the several states, and to the Automobile Association, for criticism. Then it is proposed to have a further conference, in Washington, prior to the annual convention of the National Association of Railway Commissioners. The A. R. A. Committee will take the matter up at once, and the members feel that the prospects of securing united action on this matter, in the reasonably near future, are very bright.

The Floods in the South

The floods of July 16 in the western part of North Carolina, the eastern part of Tennessee and in South Carolina, put many miles of railroad out of business for three and four days and the loss of long bridges necessitated the running of important through trains over circuitous detours for fully two weeks. In the meantime local train service was partly restored by the establishment of temporary ferries.

After two weeks of unceasing labor the Southern Railway forces, on Sunday last, completed a temporary bridge across the Catawba river at Belmont, N. C., and on Monday through trains between Washington and Atlanta resumed their trips. On the line between Asheville and Spartanburg the work required several days longer.

The Southern's bridge across the Wateree near Kingville, S. C., west of Sumter, withstood the flood until the 19th, when it was carried away, together with several loaded cars, which had been used to weight it. On the line west from Statesville, N. C., to Asheville, train service was restored for a part of the way on the 24th; but the loss of the bridge at Eufola necessitated the use of the ferry across the Catawba river for an indefinite period. In the mountains a few miles further west, between Old Fort and Ridgecrest, the work of restoring the road bed was expected to take four weeks.

On the line westward from Asheville to Knoxville, Tenn., the most serious damage was between Wolf's Creek and Del Rio. The repairs on this division necessitate the employment of many hundred men for ten days. At last reports eight men supposed to have perished with the destruction of the Belmont bridge in the flood, were still unaccounted for. The body of one man, H. P. Griffin, was found at Belmont and of another, J. N. Gordon, on an island, seven miles down stream.

The Atlantic Coast Line suffered serious interruptions to traffic without great damage to road bed or structures. A portion of the timber trestle across the Wateree River a few miles up stream from Kingville, S. C., was carried away but the trestle has now been repaired. The steel bridges at the channels of the river were not injured. The water rose four feet above base of rail on the trestles which established a new high water record—four feet higher than the great flood of 1908. Traffic between Sumter and Columbia was suspended at 9 p. m., July 18, and resumed August 1.

The water in the Santee at Remini, S. C., rose six feet above the rail on the trestle approaches to the bridge and six inches above the rail on the steel bridge. The trestle and bridge were undamaged although a new high water record was established 2.2 feet above the flood of 1908. Traffic was diverted from this bridge from Tuesday the 18th, at 9 p. m., until Sunday the 23rd, at 8 p. m., trains being run via Yemassee, S. C., and Charleston, S. C.

The water in the Santee at St. Stephens rose six inches above

the top of the rail on the steel viaduct approaches, and attained a height of 3 ft. 6 in. above the great flood of 1908. The water did not get above the rail on the channel spans. Traffic was diverted from 3 p. m., Sunday the 23rd, until 8 a. m. of Wednesday the 26th, trains being run from Charleston via Denmark and Sumter to Florence, S. C.

The A. C. L. through the storm period kept its trains moving in North and South Carolina by diverting traffic from its main lines to its branches, and subsidiaries (and, at times over a part of the Southern Railway) except between Sumter and Columbia, 42 miles. Its lines were also used for much of the traffic for other railways whose lines had been more seriously affected.

The Seaboard Air Line lost several bridges on the East Carolina division. At the Catawba river, on the North Carolina division, the damage to the bridge, with the trestle on both sides of it, left a total opening of about 500 ft. The span carried off at the Wateree river, near Camden, S. C., was 150 ft. long. On the Georgia division four spans of Catawba river bridge were carried off (600 ft.) and the total opening at that point was about 2,100 ft. Temporary repairs were completed at Wateree river, near Camden, S. C., and at Catawba river, near Catawba, S. C., so that regular train service was resumed over these lines on July 28. At the Catawba river, near Mount Holly, N. C., west of Charlotte, a ferry was established, and train service was restored on that line July 22.

The Carolina, Clinchfield & Ohio was badly damaged in the gorge of the Doe river in western North Carolina, and the restoration of the line was expected to require weeks. At last accounts traffic was still suspended between Altapass, N. C., and Marion, 31 miles.

The Carolina & North Western, which lost its bridge over the Catawba, north of Hickory, N. C., was out of business on that section for 10 days or more; but the line from Hickory to Chester, S. C., was reopened on the 24th.

The East Tennessee & Western North Carolina was badly damaged throughout its length, and the lumber mills along its line suffered severe losses.

The Lancaster & Chester, a road running from Chester, S. C., eastward 29 miles to Lancaster, suffered the loss of its Catawba river bridge, also the loss of the Cane Creek trestle, and trains for two weeks or more ran only between Chester and Fort Lawn, 20 miles. Arrangements were finally made for transferring passengers and freight over the Catawba by boat.

The East Tennessee & Western North Carolina was badly damaged throughout its length, and the lumber mills along its line suffered severe losses.

Strike Votes Being Counted

Representatives of the train service brotherhoods from various sections of the country are being quoted in the newspapers as saying that the strike vote which has just been completed is overwhelmingly in favor of a strike, the estimates from various sections ranging from 90 to 99 per cent. The votes are now being counted at the headquarters of the brotherhoods in New York City. The general chairmen for the western roads were expected to reach New York with the votes from their lines not later than August 5, and it is reported that the results will be announced at a meeting in New York on August 6.

Conferences between the National Conference Committee of the Railways and the committee representing the brotherhoods are to be resumed in New York City on Tuesday, August 8, in accordance with an arrangement reached at the conclusion of the conference on July 15. According to press despatches from Washington, William L. Chambers, commissioner of the United States Board of Mediation and Conciliation, has been keeping President Wilson informed on the controversy, and is prepared to offer the services of the board as soon as they may become necessary. Commercial clubs in various parts of the country are passing resolutions or writing letters to their representatives in Congress, urging that some action be taken to compel arbitration or reference of the controversy to the Interstate Commerce Commission. Resolutions adopted by the Nevada Railroad Commission, urging arbitration, were referred to in last week's issue. Similar resolutions have been adopted by the Arizona and New Mexico commissions.

The Transportation Brotherhoods' Publicity Bureau has issued a statement, which is in part as follows:

"The proposition of the railroads to refer the demands of the

railway brotherhoods for an 8-hour day to the Interstate Commerce Commission is nothing but a proposition to gain time for the railroads and to waste time for the men.

"The Interstate Commerce Commission is not now equipped to undertake this task. In order to undertake it, the Interstate Commerce Commission act would have to be radically amended by Congress. Such an amendment would require at least a month for passage, and upon its passage several months would be required before the commission could actually begin the work thus imposed upon it.

"Whatever may be the desirability of empowering the Interstate Commerce Commission to handle wage disputes, this is not the time to do it. The commission is overburdened with duties. A bill has been pending before Congress, urgently advocated by the railroads themselves, calling for an increase in the membership of the commission in order to enable it to handle cases already on its docket.

"If authority is conferred on the Interstate Commerce Commission by Congress to fix or exercise any control over wages, it would only apply to employees whose runs are from one state to another.

"Inasmuch as the bulk of trainmen work wholly within a state, it would result in the worst muddle possible—a few employees having their wages fixed by the United States and the rest of them standing just where they are now.

"The claim made by the railroads that, as the Interstate Commerce Commission has authority over freight rates, it should also have authority over rates of pay, is a clever and seemingly plausible argument put forward to secure public sympathy. The Interstate Commerce Commission has always taken cognizance of wages or labor costs in passing upon freight rates.

"Elaborate statistical exhibits in all general rate cases have been presented by the railroads to the commission, which set forth in great detail how many more dollars are paid out in wages and salaries now as compared with former years. As a consequence, the Interstate Commerce Commission has always passed on the question of the relation of wages to freight and passenger rates, and total operating costs."

H. A. Wheeler, vice-president of the Union Trust Company of Chicago, and chairman of the United States Chamber of Commerce special committee on the railroad situation, gave out an interview in Chicago on Monday on the strike prospects, in which he said:

"It is as clear as an open door that events are leading directly to a strike which will tie up the freight service of all the railroads of the country. At the moment there is little prospect that mediation will succeed. The future moves in the wage controversy are now fairly well outlined. The members of the four brotherhoods have voted overwhelmingly in favor of granting authority to their respective chiefs to call a strike in case the demands for an 8-hour day, with time and a half for overtime, are not granted. To be sure, this large vote was made possible by assurances quietly given to the men by the brotherhood officers that there would be no strike. Nevertheless, the brotherhood officials are now vested with the power to order a strike, at any time, without warning. The next step will be a joint conference of the brotherhood representatives and the committee of railroad managers in New York August 8, at which the brotherhood chiefs will announce the result of the strike vote.

"It can be stated positively that the railroads will make the same proposition, without change in any particular, that the men rejected in June. That proposition was to submit all questions at issue to impartial arbitration, including questions raised by the employers. The railroads in this fight have their backs against the wall. They will make no further concessions.

"The brotherhood officers presumably will again refuse to accept this proposal and will threaten interruption of traffic. Then the Federal Board of Mediation and Conciliation will step in, but its efforts will be begun under the most unfavorable conditions. In order to have arbitration the Newlands law requires that both parties shall agree on the subjects to be arbitrated. It is just on this point that the employers and employees have shown themselves unable to agree, for the men have not definitely refused to arbitrate. Next President Wilson will probably take steps personally to avert a strike, as he did in 1915. He will call in the railroad managers and appeal to them to avert such a calamity as a strike would entail. But will he tell the brotherhood chiefs what to do? Hardly; not in a presidential campaign."

The American Association of Railroad Superintendents

The twenty-ninth annual meeting of the American Association of Railroad Superintendents will be held in Memphis, Tenn., August 16, 17 and 18. Through the courtesy of the Illinois Central a special train will be provided, leaving Chicago on the morning of August 15, to convey members and their families to Memphis, and through the courtesy of the St. Louis & San Francisco a special train will be provided to leave Memphis on the morning of August 19 for St. Louis on the return trip. The meetings will be held at the Hotel Chisca. The Committee on Arrangements has arranged for a freight trucking contest, automobile rides for members of families while meetings are in session, a four-hour trip through the city by street cars, including a visit to the Memphis Zoological Gardens, boat rides, and an inspection of the Memphis railroad terminals, including an exhibition of cotton handling by the Memphis Terminal Corporation, one of the largest cotton warehouses in the world.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meetings.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, Room 3014, 165 Broadway, New York City.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, January, 1917, New York.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—H. C. Boardman, D. L. & W., Hoboken, N. J. Annual convention, October 19-21, 1916, New Orleans, La.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, East St. Louis, Ill. Next meeting, June, 1917, Denver.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.**—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, October 17, 18, New Willard Hotel, Washington, D. C.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—E. H. Hayman, Room 101, Union Station, St. Louis, Mo. Annual meeting, August 16-18, 1916, Memphis, Tenn.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Buttritt, 8 W. 40th St., New York. Annual convention, October 9-13, Atlantic City, N. J.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.**—H. G. McConaughy, 165 Broadway, New York. Annual convention, October 9-13, Atlantic City, N. J.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.**—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago.
- AMERICAN RAILWAY ASSOCIATION.**—J. E. Fairbanks, general secretary, 75 Church St., New York. Next meeting, November 15, 1916, Denver, Colo.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W., Chicago. Next convention, October 17-19, 1916, New Orleans, La.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 20-22, 1917, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June, 1917.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, August 24-26, 1916, Hotel Sherman, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.**—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 23-25, 1917, New York.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Annual meeting, May 30, 1917, San Francisco, Cal.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.**—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association. Annual convention, October 10, 1916, Waldorf-Astoria, New York.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—Willis H. Failing, Terminal Station, Central of New Jersey, Jersey City, N. J. Next meeting, May, 1917, Louisville, Ky.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.**—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—P. W. Drew, Soo Line, 112 West Adams St., Chicago.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—G. F. Conard, 75 Church St., New York. Next meeting, December 12-13, 1916, Atlanta, Ga.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—P. C. Jacobs, H. W. Johns-Manville Co., Chicago. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August; Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CINCINNATI RAILWAY CLUB.**—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.**—Warren F. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual convention, June 19, 1917, Banff, Alberta.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, C. H. & D., Lima, Ohio. Next meeting, August 15-17, 1916, Hotel Sherman, Chicago.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—J. G. Crawford, C. B. & Q. R. R., 702 E. 51st St., Chicago. Next meeting, May, 1917, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 1126 W. Broadway, Winona, Minn. Annual meeting, August 29 to September 1, Hotel Sherman, Chicago.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 17-19, Philadelphia, Pa.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—A. P. Dane, B. & M., Reading, Mass. Next annual meeting, September 12-14, 1916, "The Breakers," Atlantic City, N. J.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June, 1917.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.**—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March, 1917, Chicago.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1916, New York.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.**—H. O. Hartzell, B. & O. R. R., Baltimore, Md. Next meeting, November, 1916, Chicago.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.**—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 3-5, 1916, New York.
- RAILWAY REAL ESTATE ASSOCIATION.**—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Annual meeting, October 10, 1916, Chicago.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September 12-14, 1916, Grand Hotel, Mackinac Island, Mich.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 19-22, 1916, New York.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE TRANSPORTATION CLUB.**—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa. Annual meeting, October 18-20, Washington, D. C.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwith, A. & W. P. R. R., Atlanta, Ga. Next meeting, October 19, 1916, Birmingham, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.
- TOLEDO TRANSPORTATION CLUB.**—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings, bi-monthly, Pittsburgh.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Next meeting, June 19, 1917, Fresno, Cal.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. R. R., Cleveland, Ohio. Next meeting, September 5-8, 1916, Hotel Sherman, Chicago.
- WESTERN CANADA RAILWAY CLUB.**—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Grand Pacific Hotel, Chicago.

Traffic News

The Southern Pacific has announced an embargo, effective on July 28, on east bound freight over its Sunset-Gulf route because of congestion of traffic at Galveston and New Orleans, and a scarcity of vessels to take freight from those ports for the Atlantic seaboard. Westbound freight over the same route is not affected.

Mail Pay to be Decided by Commission

The Post Office Appropriation bill was signed by the President on July 28. It carries appropriations aggregating \$322,000,000. The postmaster general is authorized to send second-class matter by fast freight, but no publisher shall be discriminated against or be made to suffer undue delay; and appeals from the rulings of the postmaster general in this matter may be made to the Court of Appeals of the District of Columbia. There is also a clause requiring the postmaster general to have mail matter, other than that of the first class, carried by the railroads the same as express matter, at rates not exceeding those paid by the express companies. He may secure through the Interstate Commerce Commission information as to what the railroads now receive for express matter.

The present basis of pay for transportation of mails by rail is continued, but there is provision for the experimental use of the space rate principle on roads to be selected by the postmaster general, with the approval of the Interstate Commerce Commission; and by another section the Interstate Commerce Commission is authorized and directed, as soon as practicable, to determine fair and reasonable rates to be paid by the government to the railroads, and to publish the same. The commission has a free hand, and is authorized to conduct an extended investigation. Provision is also made for appeal either by the postmaster general or by any railway from any rate prescribed by the commission.

In the experimental operation of the space rate principle, the postmaster general is to employ the rates which were prescribed in the committee report made to the last Congress, namely: Not over 21 cents a mile for ordinary post office cars, with terminal rates for each trip, etc.

Transcontinental Rates Adjusted

As briefly noted in last week's issue, the western transcontinental railroads have decided to advance, effective on September 1, freight rates from eastern points to the Pacific coast terminals on which the Interstate Commerce Commission on July 15, 1915, allowed the roads to make special reductions to meet Panama Canal competition, by granting relief from the provisions of the fourth section. On account of the lack of competition through the Panama Canal under present conditions the commission recently issued another order rescinding its previous order, on petition of the Nevada Railroad Commission, and gave the road the option of advancing the rates to the coast or reducing those to intermediate points. With the restoration of the conditions governing prior to July 15, 1915, there will be, so far as eastbound traffic is concerned, a return to the rates in effect prior to the reductions made to meet the canal competition under the commission's order. As to westbound traffic, it will be the purpose of the rail carriers for the present to adjust the rates to the Pacific coast terminal points so as to continue to preserve to the intermediate points the present rates under the percentage relation between intermediate and terminal rates fixed by the commission.

The westbound commodities principally affected are those included in what is known as "Schedule C," which comprises something over 100 articles, on which the water competition was especially keen. Special relief was also granted on a number of commodities moving eastbound. The eastbound rates affected are on asphaltum, beans, lentils, peas, canned goods, barley, dried fruit and wine. The rate on canned goods, which had been reduced to 62½ cents, will be advanced to 85 cents per hundred pounds. The rate on dried fruit in sacks, which was reduced to \$1.10, will be restored to \$1.30.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Public Utilities Commission of Colorado has filed a petition with the Interstate Commerce Commission for reductions ranging from 25 to 35 per cent in class rates from Denver and other Colorado points to a large number of points throughout the west, and also for a readjustment of rates between Denver and Galveston.

Milling Logs in Transit on Tap Lines

Opinion by Commissioner Harlan:

A request that trunk line carriers generally be required to establish milling-in-transit arrangements on logs in connection with tap lines in the lumber blanket rate territory in the southwest is denied.

The commission notes that the establishment by a trunk line of transit arrangements on logs hauled by it to mills located upon its own lines in the blanket territory would subject to prejudice and disadvantage the mills on the tap lines with which it connects and has joint rates, unless the trunk line offered them a similar and equal arrangement. It also points out the prejudice and disadvantage under such circumstances to mills in the same territory that get their logs in over unincorporated logging roads or by teams over tram roads, or by similar means. (40 I. C. C., 597.)

Applications Under the Panama Canal Act

Maine Central Boat Lines. Opinion by Commissioner Harlan:

The Maine Central is allowed to continue its operation of a steamboat service from its rail end at Mount Desert Ferry, on the eastern coast of Maine, to various points on Mount Desert Island and on the shores of Frenchman's Bay, and also a similar boat service between its terminus at Rockland, in the same state, and various points along the shores of Penobscot Bay. (40 I. C. C., 272.)

Boston & Maine Boat Lines. Opinion by Commissioner Harlan:

The Boston & Maine operates the Mount Washington on Lake Winnepesaukee in New Hampshire from June 20 to September 20, to take care of the summer tourist traffic to the towns and summer cottages on the lake. It also operates the Lady of the Lake (under Canadian registry) from June to October on Lake Memphremagog. The lake is about 30 miles long and partly in Vermont and partly in Quebec. The only point touched in the United States is Newport, Vt. The commission finds that the Boston & Maine does or may compete with its steamers within the meaning of the act, but that the water services in question are operated in the interest of the public, are of advantage to the convenience and commerce of the people, and their continued operation will neither exclude, prevent nor reduce competition, and should be permitted. (40 I. C. C., 565.)

Central Vermont Boat Lines. Opinion by Commissioner Clements:

The Central Vermont is allowed to continue its operation of vessels between New London, Conn., and New York, and to install a similar service between Providence, R. I., and New York. The Central Vermont is owned 70 per cent by the Grand Trunk. It operates a rail line from St. Johns, Quebec and Rouses Point, N. Y., through Vermont, Massachusetts and Connecticut to New London. From the last named point the Central Vermont Transportation Company carries traffic to pier 29, East River, New York City. The Central Vermont is now building a line from Palmer, Mass., to Providence, R. I., known as the Southern New England. The transportation company now operates between New York and New London two freight steamers, and has docked at New London, awaiting the completion of the Palmer-Providence line, two new combination passenger and freight steamers for operation between New York and Providence. (40 I. C. C., 589.)

The New England Milk Case

Opinion by Commissioner McChord.

The commission in this case holds that the Boston & Maine and other carriers in New England have not justified increased rates proposed in September, 1915, on milk and cream, etc., to Boston, Mass. It further finds that the New England or leased-car system under which 75 per cent of the Boston & Maine's fluid milk traffic is carried is unlawful. The carriers are allowed to put into effect a graduated scale of per can rates prescribed by the commission higher than those now in effect for milk in less than carloads in passenger, milk and mixed train service. Milk carried in freight trains in carloads without ice or in less than carloads with ice when necessary shall be charged 75 per cent of this scale. Carload rates will be provided where the shipments are from one consignor to one consignee from one point of origin to one destination to be iced by the shipper at not more than 87½ per cent of the scale. These prescribed rates in each case include the return of the empty containers.

As a result of many informal and formal complaints regarding the regulations and practices of the common carriers engaged in the interstate transportation of milk the commission instituted a general investigation throughout the United States with a view toward the establishment of uniformity. It developed soon after the hearing commenced in Boston that conditions regarding the transportation of milk and cream to Boston and other New England cities were wholly different from those elsewhere. It was therefore determined to dispose of the New England situation in a separate report. The report relates almost entirely to shipments to Boston, although the rates apply between all interstate points in New England. The milk supply of cities outside of the territory around Boston is largely secured from nearby intrastate points.

About 75 per cent of the fluid milk shipped into Boston over the Boston & Maine moves in carload lots, under what is known as the New England, or leased-car, system. Under this system the carrier transports in both directions a milk car for a specified charge per annum. The carrier furnishes the car and warms it when attached to the train in winter. The milk dealer who contracts for the running of the car loads and unloads the milk and cream and provides refrigeration when required. The standard can in New England holds 8½ quarts. The minimum carload is 1,050 8½ quart cans, or 8,925 quarts or the equivalent. Charges in proportion are made for cans in excess of the minimum. The dealer pays the carload rate from starting point of the shipment. It is also provided that milk and cream may be loaded into the car at scheduled stops of the train on the going trip and empty cans unloaded on the return trip. The charge for the car includes carrying the dealer's caretakers in both directions. The method pursued by the milk dealer in originating a leased-car route is to go among the farmers of a given section and contract with them for the delivery at certain railroad stations of an agreed quantity of milk at a given price and for a given period, usually six months. The containers are generally owned and supplied by the dealer, and he cleans and keeps them in repair.

It was proposed to change the charges on the leased cars so that the same charges for passenger and milk train service would apply up to 75 miles; lower charges for distances 76 to 149 miles and increased charges for distances over 165 miles. Of the leased cars, 70 per cent start from points more than 165 miles from Boston, and of this proportion 40 per cent start from more than 200 miles.

Practically no milk is shipped in New England by express, but there is a considerable express traffic in cream.

The carriers contended that the present rates were too low for the service rendered. W. J. Cunningham, professor of transportation at Harvard University, presented an exhibit which was the result of an endeavor to ascertain the relation between the revenue derived by the Boston & Maine from its milk traffic and the share of the expenses which should be apportioned to that traffic. His figures showed that the operating revenues derived from the transportation of milk in passenger trains totaled \$469,927 yearly; in freight trains \$203,592, or a total from both services of \$673,519, and, further, that this traffic was carried at a loss of 2.605 cents per revenue car mile for traffic in both passenger and freight trains, or of 5.22 cents in passenger trains alone. The commission found reason to question some of Mr. Cunningham's conclusions, but agreed that the results could be accepted as indicative that the milk traffic of the Boston & Maine is not, on the whole, remunerative.

The commission found special reason to condemn the New England or leased-car system. It notes in its report that "transportation by leased cars is a unique method in this country. New England carriers are the only ones which have adopted such a system. Its undoubted tendency is to create and perpetuate a monopoly of the milk transportation business in the hands of those who operate leased cars. The greater quantity of milk consumed in metropolitan Boston is shipped to four large dealers. * * * The extent to which the consolidation of the milk business in a few hands has been carried in metropolitan Boston is not approached in any other city as far as our investigation shows."

It notes further that "the leased-car rates are so grouped and adjusted that the user thereof can go long distances from the city and secure his supply of milk and cream. It is an economic waste to haul milk for long distances if it may be secured at shorter distances. No rate adjustment can be successfully defended which deprives any shipper of the natural advantage of proximity to point of consumption."

By section 1 of the act it is made the duty of common carriers to furnish transportation of property upon reasonable request therefor; and transportation is defined to include all services in connection with refrigeration, icing and handling of property transported. Under the leased-car system, New England carriers delegate to private individuals a part of their transportation function. If this may lawfully be done at all, carriers are bound to establish charges and maintain regulations with respect thereto which do not unduly discriminate against any shipper engaged in the same business. The leased-car system is inconsistent with the per can system. The two can not, with justice to all shippers, be maintained contemporaneously by carriers in New England. Inasmuch as the two systems can not be operated at the same time with just and reasonable rates and regulations applicable to each, the one which confers special privileges on particular shippers must give way in the interest of the general shipping public.

In establishing per can rates the commission considered that 75 per cent of the traffic into Boston was transported at very low charges as compared with the other 25 per cent; that a change of rates to a reasonable distance scale means increased charges for the greater volume of the traffic; that much of the work incident to the carrying of the milk was done by the users of leased cars rather than the carriers; that the rates established can not under such conditions be taken as an expression by the commission of what under ordinary circumstances would be reasonable charges elsewhere.

The following scale of maximum rates in cents per can is found reasonable for the interstate transportation over the lines of carriers in New England of milk, in less than carloads, including skim milk, buttermilk and pot cheese, in milk, passenger and mixed freight and passenger trains, in milk or refrigerator cars, heated in winter and iced in summer, including the return of the empty containers:

Miles	8½-quart	10-quart	20-quart	21¼-quart	40-quart	46-quart	50-quart
1 to 20.....	3.4	3.8	6.3	6.7	11.4	12.8	13.8
21 to 40.....	4.2	4.7	7.8	8.2	13.9	15.7	17.0
41 to 60.....	4.9	5.4	9.0	9.4	16.1	18.2	19.6
61 to 80.....	5.4	6.1	10.0	10.5	18.0	20.3	21.9
81 to 100.....	6.0	6.7	11.0	11.5	19.7	22.2	24.0
101 to 120.....	6.4	7.2	11.9	12.5	21.3	24.0	25.9
121 to 140.....	6.9	7.7	12.7	13.3	22.8	25.7	27.7
141 to 160.....	7.3	8.2	13.5	14.1	24.2	27.2	29.4
161 to 180.....	7.7	8.6	14.2	14.9	25.5	28.7	30.9
181 to 200.....	8.1	9.0	14.9	15.6	26.7	30.1	32.4
201 to 220.....	8.4	9.4	15.6	16.3	27.9	31.4	33.9
221 to 240.....	8.8	9.8	16.2	17.0	29.0	32.7	35.3
241 to 260.....	9.1	10.2	16.8	17.6	30.1	34.0	36.6
261 to 280.....	9.4	10.5	17.4	18.2	31.2	35.2	37.9
281 to 300.....	9.7	10.9	18.0	18.8	32.3	36.3	39.1
301 to 320.....	10.0	11.2	18.5	19.4	33.2	37.4	40.3
321 to 340.....	10.3	11.5	19.0	20.0	34.1	38.5	41.5
341 to 360.....	10.6	11.8	19.6	20.5	35.1	39.6	42.6
361 to 380.....	10.9	12.2	20.1	21.1	36.0	40.6	43.7
381 to 400.....	11.1	12.5	20.6	21.6	36.9	41.6	44.8
401 to 420.....	11.4	12.8	21.1	22.1	37.8	42.6	45.9
421 to 440.....	11.7	13.0	21.5	22.6	38.6	43.5	46.9
441 to 460.....	11.9	13.3	22.0	23.1	39.4	44.5	47.9
461 to 480.....	12.2	13.6	22.4	23.6	40.2	45.4	48.9
481 to 500.....	12.4	13.9	22.9	24.0	41.0	46.3	49.9

Rates on cream should not exceed the rates on milk by more than 25 per cent. Where milk and cream are transported in freight cars in freight trains in carloads without ice and in less than carloads with ice, when necessary, and including the return of the empty containers, the charge should be based on rates not to exceed 75 per cent of those provided in the scale given above. Carload rates should be provided for where the shipments are from one consignor to one consignee from one point of origin

to one destination to be iced by the shipper, at not more than 87½ per cent of the scale, including the return of the empty containers.

Rates on milk and cream in bottles in cases should be established on the present relationship to rates in cans in conformity with the rates found reasonable. Provision should also be made for mixed shipments of milk and cream in carloads; the rates to be made on the basis of the per can rates for each commodity in carloads, subject to the minimum provided for milk.

The carriers should keep a detailed record of receipts and expenditures on account of the milk and cream traffic under the new system and rates for the period of one year. At the end of that time, if it appears that the rates and regulations prescribed are not reasonable, the matter may be called to the commission's attention by the defendants. Commissioner Hall dissents (40 I.C.C. 699).

Commodity Rates from St. Louis to Northeast Texas

Dallas Chamber of Commerce, Freight Bureau Department et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Meyer:

Certain carload commodity rates from St. Louis to points in northeast Texas are found unreasonable to the extent of 5 cents per 100 lb., and from Kansas City to the same points to the extent that they are not 5 cents per 100 lb. less than the rates from St. Louis.

The average of 87 principal commodity rates complained of shows that the commodity rates from St. Louis to northeast Texas are approximately 50 per cent in excess of the rates on the same commodities to Shreveport. The carriers have not justified so great a difference. Shreveport's proximity to the Mississippi river, together with the difference in distance, cannot be regarded as a justification for the existing spread between Shreveport and northeast Texas in rates from St. Louis and Kansas City for an average difference in distance of approximately 88 miles.

Group rates can be considered just and reasonable only in so far as they do not effect unjust discrimination. Carriers have found it necessary to depart from the Texas common-point adjustment on traffic from Kansas City to the Dallas and Fort Worth group. A like exception should be made in rates from St. Louis and Kansas City to northeast Texas. The rates to northeast Texas are admittedly such as would be considered reasonable for an average haul of from 800 to 825 miles, that being the average haul to Texas common-point territory. Rates so constructed cannot be considered reasonable in so far as they are discriminatory. As to traffic from St. Louis and Kansas City to points in northeast Texas, those points are at a disadvantage as compared with Shreveport, a competing locality, by reason of the shorter distance to Shreveport, and the competitive conditions at that point, but that natural disadvantage ought not to be unduly increased by an artificial rate adjustment.

The principal cities affected by this complaint are Dallas and Fort Worth. They are approximately 696 miles from St. Louis, and 510 miles from Kansas City, via the short lines. The average distance from St. Louis to northeast Texas is probably not far from 650 miles, and the average from Kansas City about 550 miles. It is reasonable to require the carriers to recognize the position of the points in northeast Texas, and to establish from St. Louis to all those points rates which, with certain exceptions, shall be 5 cents per 100 lb. less than the present rates. Points in northeast Texas east of the so-called Dallas and Fort Worth group are practically the same distance from Kansas City and St. Louis, and take the same rates from both points. The rates from Kansas City to such points are unreasonable to the extent that they exceed the rates from St. Louis. Points in the western portion of northeast Texas and included in the Dallas-Fort Worth group are approximately 100 miles nearer to Kansas City than to St. Louis, and take rates from Kansas City from 5 to 8 cents less per 100 lb. than from St. Louis. These rates from Kansas City are unreasonable to the extent that they are not as much as 5 cents per 100 lb. less than from St. Louis.

Commissioners Harlan and Daniels dissent, the latter partly because "the use of rates to Shreveport as a criterion of the intrinsic reasonableness of the rates from these two gateways to northeast Texas is peculiarly inappropriate for the reason that this commission has said, not once but repeatedly, that rates from St. Louis to Shreveport are subnormal." (40 I. C. C., 619.)

Railway Officers

Executive, Financial, Legal and Accounting

A. R. Baldwin, general attorney of the Western Pacific at San Francisco, Cal., has been appointed also vice-president.

W. S. Easton has been appointed auditor of the Riverside, Rialto & Pacific, with headquarters at Riverside, Cal., vice W. C. Scott.

H. C. Abbey, general traveling auditor of the Missouri-Pacific-St. Louis, Iron Mountain & Southern, has been appointed auditor of station accounts.

Edwin Gould, chairman of the board of the St. Louis Southwestern at New York, has been elected also president, to succeed the late F. H. Britton. J. M. Herbert has been elected first vice-president in charge, with headquarters at St. Louis, Mo.

Operating

J. A. Bennett, having resigned as general manager of the Bridgton & Saco River, E. A. Crosby has been appointed acting general manager, with office at Bridgton, Maine.

Robert M. Patterson, special agent in the general manager's department of the Pennsylvania Railroad at Philadelphia, Pa., on July 1 retired under the pension rules of the company.

G. D. Hood has been appointed superintendent of telegraph for the receiver of the Chicago, Rock Island & Pacific, with headquarters at Chicago, Ill., vice C. H. Hubbell, transferred, effective August 1.

M. H. Broughton, whose appointment as superintendent of the Illinois division of the Baltimore & Ohio Southwestern has been announced, was educated at the Albion (Ind.) high school,



M. H. Broughton

and entered railway service on April 22, 1886, as oil house man at Garrett, Ind., on the Baltimore & Ohio. He continued in the employ of that road as brakeman, freight conductor and passenger conductor, until 1900, when he was made general yardmaster at Chicago Junction, Ohio. He remained in that position from April 1 to August 1 of that year, when he was transferred as assistant trainmaster to the Newark division. Leaving the Baltimore & Ohio in 1905, he engaged in the hotel business for several years, returning to

railroad work in 1909, as superintendent of the L. J. Smith Construction Company, Kansas City, Mo. He was later trainmaster on the Omaha division of the Missouri Pacific, assistant trainmaster of the Cumberland division of the Baltimore & Ohio, trainmaster of the same division, supervisor of transportation, assistant superintendent of the Cleveland division, and assistant superintendent of the Indiana division of the Baltimore & Ohio Southwestern. His appointment as superintendent of the Illinois division was effective on July 10.

E. W. Mason, superintendent of the western division of the Western Pacific, with headquarters at Sacramento, Cal., has been appointed general superintendent, with office at the Mills building, San Francisco, effective August 1.

F. E. Haines, trainmaster of the Chicago, Burlington & Quincy lines east of the Missouri river, at Aurora, Ill., has been appointed assistant superintendent of the Ottumwa division, with headquarters at Burlington, Iowa, vice M. F. MacLaren, promoted.

Henry E. Hart, assistant yardmaster of the Buffalo, Rochester & Pittsburgh, at Lincoln Park, N. Y., has been appointed car accountant, with headquarters at Rochester.

J. P. Quigley, superintendent of transportation and superintendent of telegraph of the Western Pacific at San Francisco, Cal., has been promoted to superintendent of the western division, with office at Sacramento; K. M. Nicoles, trainmaster at Stockton, Cal., has been appointed superintendent of transportation, with office at San Francisco; J. H. Leary has been appointed assistant superintendent of the first and second districts, western division, with office at Stockton.

Traffic

C. G. Randall has been appointed general freight and passenger agent and auditor of the Wabash, Chester & Western, with headquarters at Chester, Ill., in place of W. S. Easton, resigned, and C. E. Kingsbury, deceased.

C. M. Knox, general agent of the Southern Pacific lines at Los Angeles, Cal., has been appointed general agent at Cincinnati, Ohio, vice A. G. Little, transferred to St. Louis, Mo. G. T. Hild, general agent at St. Louis, has been appointed assistant general agent at Chicago, Ill., vice O. P. Bartlett, promoted.

J. T. Hendricks, freight traffic manager of the Western Pacific, has been promoted to traffic manager, with headquarters at San Francisco, Cal. Bode K. Smith, assistant general passenger agent, has been appointed general passenger agent, with office at San Francisco, effective August 1.

F. V. Berry, chief of tariff bureau of the Maine Central, the Bridgton & Saco River and the Sandy River & Rangely Lakes at Portland, Maine, has been appointed assistant general freight agent of the Maine Central and the Portland Terminal Company. Lucien Snow has been appointed chief of tariff bureau, in place of Mr. Berry.

Fred J. Robinson, who has been appointed general passenger agent of the Central of Georgia, with headquarters at Savannah, Ga., as has already been announced in these columns, was born on November 14, 1869, at Micanopy, Fla., and was educated in private schools at Columbus, Ga. He began railroad work in 1889 as a clerk in the local freight station of the Central of Georgia, at Columbus; then to 1890 was receiving clerk at that place. From 1890 to 1893 he was station ticket agent at Columbus, then to February, 1894, was traveling passenger agent of the same road. From February to November, 1894, he was assistant station ticket agent at Savannah, Ga., and then to December, 1897, he was city passenger agent of the same road at Atlanta, Ga. On January 1, 1898, he was appointed western passenger agent at Chicago, and from the following April to 1899 represented the same road in the movement of troops in the South during the Spanish-American war. He served as traveling passenger agent at Atlanta, Ga., until July, 1899, and then for two years was chief clerk to the general passenger agent at Savannah. In July, 1901, he was promoted to assistant general passenger agent at Savannah, which position he held at the time of his recent appointment as general passenger agent of the same road, with headquarters at Savannah, as above noted.



Fred J. Robinson

Engineering and Rolling Stock

F. D. Batchellor, district engineer maintenance of way of the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati, Ohio, has had his jurisdiction extended to include the northwest district of the Baltimore & Ohio Southwestern.

F. E. Starkweather has been appointed assistant signal engineer of the Pere Marquette. J. J. Evans, supervisor of signals at Saginaw, Mich., has resigned to engage in other work, and is succeeded by C. A. Nelson, chief draftsman in the signal department.

E. G. Lane, district engineer maintenance of way of the northwest district of the Baltimore & Ohio Southwestern, has been appointed engineer maintenance of way of the western lines of the Baltimore & Ohio, and of the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati, Ohio.

T. W. McCarthy, master mechanic of the Kansas division of the Chicago, Rock Island & Pacific, with office at Horton, Kan., has been appointed master mechanic in charge of shops at Horton, reporting to the mechanical superintendent at El Reno, Okla. R. J. McQuade has been appointed master mechanic of the Kansas division, vice T. W. McCarthy, transferred, with headquarters at Herington, Kan. G. W. Cuyler has been appointed master mechanic of the St. Louis and Kansas City terminal divisions, with headquarters at Armourdale, Kan., vice R. J. McQuade, transferred, effective August 1.

OBITUARY

T. Mackrell, division superintendent of the Erie at Huntington, Ind., died at that city on July 24.

John Millen, president and general manager of the Duluth & Northern Minnesota, died at Duluth, Minn., on July 27.

William Wratten, who retired as district master mechanic of the Chicago, Milwaukee & St. Paul at Minneapolis, Minn., in September, 1913, died at that city on July 28.

W. H. Phelps, formerly attorney for the St. Louis & San Francisco, and later for the Missouri Pacific in Missouri, died at Rochester, Minn., on July 26. Mr. Phelps was for many years a prominent representative of railroad interests at Jefferson City, but on January 1, 1909, resigned from railroad service, and had since been conspicuous as an anti-railroad member of the legislature.

James Peabody, statistician of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, Ill., died at Topeka, Kan., on July 25, after undergoing an operation. Mr. Peabody was born at Norwich, Conn., on February 7, 1845, and was educated in the public schools and at Aurora Academy, where he graduated in 1860. He entered railway service in 1873, as general agent of the Missouri, Kansas & Texas, in Texas. From 1873 to 1879, he was commercial agent of the Chicago, Burlington & Quincy at Cincinnati, Ohio; from 1879 to 1880, tariff clerk at Chicago, and from the latter date until 1887, pool commissioner of the same road. For about a year, he was chief clerk in the general freight department of the Chicago, Indianapolis & Louisville. In 1888, he was made editor of the Railway and Engineering Review, resigning in 1897 to become statistician of the Santa Fe.



J. Peabody

UNITED STATES STEEL TRADE.—The United States has furnished nearly 80 per cent of Great Britain's imports of semi-finished steel since the war started, whereas previous to the war the United States furnished less than 20 per cent of such imports, and Germany nearly 80 per cent of the total. In the first two months of this year the United States furnished 84 per cent of the British imports of semi-finished steel.—*Iron Age*.

Equipment and Supplies

LOCOMOTIVES

THE BOSTON & ALBANY has ordered 5 Mallet type locomotives from the American Locomotive Company.

THE HOUSTON & BRAZOS VALLEY is reported as contemplating the purchase of one ten-wheel freight locomotive.

THE ASHLAND COAL & IRON COMPANY has ordered one locomotive from the American Locomotive Company.

THE NORTHERN RAILWAY OF SPAIN, reported in the *Railway Age Gazette* of April 28 as being in the market for locomotives, has ordered 15 locomotives from the American Locomotive Company.

FREIGHT CARS

THE FRENCH GOVERNMENT has revived its inquiry for 500 to 2,000 box cars.

THE HOUSTON & BRAZOS VALLEY is reported as contemplating the purchase of a caboose.

THE ALIQUIPPA & SOUTHERN is expected to place orders shortly for 30 side dump hopper cars.

THE AMERICAN SMELTING & REFINING COMPANY, New York, has issued inquiries for 50 200,000-lb. capacity gondola cars, with six-wheel trucks.

THE PONCA REFINING COMPANY, Oklahoma City, Okla., has ordered 40 40-ton steel tank cars from the American Car & Foundry Company.

THE CUSHING REFINING COMPANY, Oklahoma City, Okla., has ordered 40 40-ton steel tank cars from the American Car & Foundry Company.

THE BALTIMORE & OHIO has bought 1,500 100,000 lb. capacity hopper cars from the Jamison Coal & Coke Company, Oliver building, Pittsburgh, Pa.

THE PRODUCERS' REFINING COMPANY, Oklahoma City, Okla., has ordered 40 40-ton and 40 50-ton steel tank cars from the American Car & Foundry Company.

THE RUSSIAN GOVERNMENT's recent order for 28,000 axles and about 56,000 cast iron wheels was divided about equally between the Pressed Steel Car Company and the American Car & Foundry Company.

PASSENGER CARS

THE DULUTH, SOUTH SHORE & ATLANTIC is inquiring for 2 baggage cars, 2 first-class coaches and 2 second-class coaches.

THE HOUSTON & BRAZOS VALLEY is reported as contemplating the purchase of 2 passenger cars and 3 industrial passenger cars.

IRON AND STEEL

THE LEHIGH VALLEY has ordered 400 tons of steel from the Pennsylvania Steel Company for a bridge at Rochester, N. Y.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 195 tons of steel from the American Bridge Company for 3 90-ft. turntables.

THE BOSTON & MAINE has divided an order for 200 tons of bridge steel between the American Bridge Company and the Fort Pitt Bridge Works.

THE DULUTH, MISSABE & NORTHERN has ordered 201 tons of steel from the American Bridge Company for a bridge over the White Face river at Kelsey, Minn., and 115 tons of steel from the same company for a bridge over the St. Louis river at Forbes, Minn.

SIGNALING

THE BALTIMORE & OHIO will install complete automatic block signals on the Cumberland division, using the Federal Signal Company's type "4," 10-volt d. c. signal mechanisms.

THE CINCINNATI, HAMILTON & DAYTON will install 79 automatic block signals on the Toledo division. The signal mechanisms are of the Federal Signal Company's type "4," 10-volt direct current.

THE DENVER & RIO GRANDE has let a contract to the Protective Signal Manufacturing Company, Denver, Colo., for a complete installation of 11 highway crossing signals embodying the National wig-wag, oscillators, bells, etc., to be located between Denver and Pueblo. The signals will be operated by 10-volt storage battery.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has recently received the 104 model 2A signals and other materials for its d. c. automatic signal installation between Bloomington, Ind., and New Albany. This material is being furnished by the General Railway Signal Company and the installation will be made by railroad company forces.

THE SOUTHERN has recently received material from the General Railway Signal Company for the installation of the 74 miles, double track automatic block signal system between Orleans, Va., and Amherst. This is a part of the large program of automatic signaling being carried out by the Southern which has been referred to in past issues.

THE NEW YORK, NEW HAVEN & HARTFORD has recently received from the General Railway Signal Company the material for its electro-mechanical interlocking plant at Rye, N. Y. This plant comprises 32 electric levers (23 working and 9 spare) and 16 mechanical levers (12 working and 4 spare). The machine will be installed by the railroad company's forces.

THE CHICAGO GREAT WESTERN has placed an order for 79 crossing bells of the locomotive type for installation at street and highway crossings. A check was made of all the dangerous crossings on the system not already protected and the result is the order for the protection of these 79 crossings. Illuminated danger signs for night indications will be installed in connection with the bells at the important street crossings.

THE SAN PEDRO, LOS ANGELES & SALT LAKE will install the "Absolute-Permissive" automatic block signal system on 112 miles of its line between Rox, Nev., and Modena, Utah. The signal materials to be used in this installation are 192 Federal type "4," 10-volt d. c. signal mechanisms with arms to be operated in three positions, upper right-hand quadrant; Federal type "F" track and line relays and type "AP" polarized relays.

THE LOUISVILLE & NASHVILLE is installing two selectively controlled signals to be known as "hold main" signals, being practically the same as "take-siding" signals such as have been in service on the Michigan Central for some time, controlled from train order offices. The materials for these signals are being furnished by the General Railway Signal Co. This road has also received 340 model 2A signals and other d. c. apparatus for the automatic block signal installation between La Follette, Tenn., and Etowah, and between Calera, Ala., and Montgomery, previously mentioned in these columns. This work will be installed by railroad company forces, the materials being furnished by the General Railway Signal Company.

THE LEHIGH VALLEY has let a contract to the General Railway Signal Company for the installation of an electric interlocking plant in the Buffalo terminal. This plant will comprise a Model 2 electric interlocking machine having 90 working levers and 14 spaces. The high and dwarf signals will be Model 2A, semaphore type; all switches will be operated by Model 5 switch machines and all track circuits will be operated by alternating current. This road is also installing an electro-mechanical interlocking plant at Port Reading, N. J., for which materials have recently been received from the General Railway Signal Company. The machine is a Model 2C comprising 24 electric levers for signals, 48 spare electric spaces, 16 mechanical levers for switches, 16 mechanical levers for facing point locks and four spare mechanical spaces. There will be 11 high and 13 dwarf signals, both of the Model 2A type; 6 Model 9 semaphore tower indicators, 13 Model 9 disk tower indicators and 3 Model 9 double disk tower indicators.

Supply Trade News

Walter D. Thomas, for many years representative in the southeastern states for the Rodger Ballast Car Company, Chicago, died July 10.

T. F. Flanagan, assistant sales manager of the Pyrene Manufacturing Company, New York, has been appointed general sales and advertising manager.

The Virginia Equipment Company, Toledo, Ohio, makers of the Virginia dust guards, has appointed the Mechanical Specialties Company, Park Row building, New York, its eastern representative.

The American Steam Gage & Valve Manufacturing Company, Boston, Mass., has moved its Chicago office and stock room, Charles C. Kilander, manager, to a new building at 25-27 South Jefferson street.

James A. McIntosh, a member of the contracting firm of McIntosh Brothers, died in Milwaukee July 28, at the age of 71 years. Mr. McIntosh constructed a considerable part of the Pacific Coast extension of the Chicago, Milwaukee & St. Paul.

A. C. Garrison has been elected president of the Corrugated Bar Company, St. Louis, Mo., to succeed his father, D. E. Garrison, deceased. A. L. Johnson has been appointed vice-president and general manager, and W. H. Kennedy, vice-president and treasurer. W. M. Armstrong, vice-president and sales manager, has resigned.

The bridge and construction business heretofore conducted at Steelton, Pa., by the Pennsylvania Steel Company of Delaware, will henceforth be carried on by the Bethlehem Steel Bridge Company of Delaware, a new company, the officers of which are G. H. Blakeley, president; Thomas Earle, vice-president; B. H. Jones, secretary and treasurer, and F. A. Shick, controller.

John I. Mange has been elected vice-president of the J. G. White Management Corporation, New York, N. Y. Mr. Mange has been associated with the J. G. White Management Corporation since 1912, at which time he was elected vice-president of the Associated Gas & Electric Company, a holding company of electric and gas properties in New York, Kentucky, Ohio and Tennessee, managed by the J. G. White Management Corporation.

Charles L. Brown, for many years associated with Manning, Maxwell & Moore, Inc., has been appointed western sales manager, railroad department, of the brass goods division of Manning, Maxwell & Moore, embracing the Ashcroft Manufacturing Company, the Consolidated Safety Valve Company, the Hancock Inspirator Company and the Hayden & Derby Manufacturing Company. Mr. Brown's headquarters will continue, as in the past, to be at the Chicago office of the company, 27-29 North Jefferson street.

The International Oxygen Company, New York, is installing a new plant at College Point, L. I., for the manufacture of oxygen and hydrogen gas. It is expected that the installation will be completed late in August or early in September, after which the company's increasing trade in Brooklyn and vicinity, as well as in Manhattan, will be largely handled from this point. Heretofore this local business has been supplied from the company's Newark works, and the new location will mean larger and better facilities and more prompt service in the supply of gases in cylinders.

The following announcement has been made by the law department of the Union Switch & Signal Company: "The Union Switch & Signal Company, General Railway Signal Company, Federal Signal Company and Hall Switch & Signal Company have entered into a cross-licensing agreement under the several patents, applications for patents and inventions owned by them respectively, copies of which agreement have been filed with the Department of Justice and the Federal Trade Commission. The purpose of the agreement is to end all patent litigation between the several companies and to put each in a position to make the safest and most effective types of signaling and interlocking systems and apparatus.

By the production of such systems and apparatus the interests of the manufacturers, railroads and the traveling public will be promoted."

Harry M. Evans has been appointed assistant western sales manager of the Franklin Railway Supply Company, with office in the McCormick building, Chicago. Mr. Evans was born at Meadville, Pa., and was educated in the public schools at that place. He began railroad work as a call boy on the Erie, and served in various positions in the mechanical, transportation and traffic departments of that road. He entered the mechanical department of the Franklin Railway Supply Company October 1, 1908, as traveling representative, which position he held until his recent promotion to the sales department, as noted above.

Frederick C. Gedge, manager of wire mills of the Chicago district of the American Steel & Wire Company, and vice-president of the Gedge Brothers Iron Roofing Company of Anderson, Ind., died at his home in Chicago on July 28. Mr. Gedge associated himself with the American Wire Nail Company at Anderson, Ind., in 1885, and at the time of its purchase by the American Steel & Wire Company in 1898 was its vice-president. He was for some years superintendent of the Waukegan (Ill.) plant of the American Steel & Wire Company, and was later promoted to the position of manager of wire mills of the Chicago district, which he held at the time of his death.

The Page Woven Wire Fence Company, Monessen, Pa., has secured the exclusive right to draw and sell Aristos copperweld wire from rods manufactured by the Copper Clad Steel Company, Pittsburgh, Pa. The Page Woven Wire Fence Company as the pioneer manufacturer of woven wire fencing early found it necessary to erect its own steel and wire mills and to operate chemical and physical laboratories. A new modern building has been installed in connection with this plant, including all the necessary wire drawing machinery to handle this new copperweld to the best advantage. In the same building are located the tinning department to prepare the wire for rubber covering and the straightening and cutting machines used in turning out bond wires, guy wires, etc. After being drawn the wire is tested for breaking strength, for torsion and for elongation. From the time the wire is first broken down from the rod until its final wrapping it is handled with gloves to insure its being absolutely free from dirt and grease.

Contracts for War Munitions Totaling \$105,000,000 Awarded Railway Supply Firms

Including the order for \$18,000,000 worth of 9.2 in. shells given the American Car & Foundry Company as reported in last week's issue, contracts have been placed with railway supply manufacturers during the past fortnight for something like \$105,000,000 worth of shells and fuses. This large total includes the following orders:

Reports say that the Baldwin Locomotive Works has received additional contracts, totaling about \$15,000,000, for 6 in. and 12 in. shells.

The American Brake Shoe & Foundry Company has received a contract from the British Government for 9.2-in. shells valued at about \$25,000,000.

The New York Air Brake Company has received a contract from the British government for 600,000 fuses for high explosive shells, totaling probably about \$1,000,000.

The American Steel Foundries have received an order from the British Government for between 400,000 and 500,000 8-in. shells, totaling about \$20,000,000. The Westinghouse Electric & Manufacturing Company will do the machining of the shells.

The American Locomotive Company, reported in last week's issue as having closed a contract valued at about \$15,000,000 for 8-in. shells for Great Britain, has received an additional order from the same government for 6-in. shells totaling about \$3,000,000, and also an order for 9.2 in. shells, totaling between \$6,000,000 and \$8,000,000.

TRADE PUBLICATIONS

ROCK ISLAND LINES.—The passenger department of the Chicago, Rock Island & Pacific has issued a map of the Mexican border in colors, showing the various points of interest in that region.

Railway Construction

ATLANTIC COAST LINE.—A contract has been given to Wade, Clower & Wade, Jacksonville, Fla., to build the extension of the Haines City branch from the present southern terminus at Sebring, Fla., south via Venus, Palmdale and Hall City to Immokalee, 80 miles, with a branch to Moorehaven, 20 miles. The maximum grade will be 0.4 per cent compensated and the maximum curvature 4 degrees. There will be a drawbridge over the Caloosahatchee river. The company expects to develop a traffic in citrus fruit, vegetables and lumber. (February 11, p. 271.)

CUMBERLAND & MANCHESTER.—According to press reports, the first section of 12 miles, from Barbourville, Ky., north, was recently opened for freight traffic. The line is being built from Barbourville north to Manchester, 24 miles. (March 31, p. 773.)

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—This company has awarded a contract for a line from Spirit River, Alta., to the west province border, 54 miles, to McPherson & Quigley, Adams Block, Edmonton. W. R. Smith, Edmonton, chief engineer.

FLORIDA CENTRAL & GULF.—Application has been made for a charter in Florida with \$200,000 to build or acquire and operate a line from Hernando in Citrus county, Fla., north to Rockwell, thence west to Inglis, 34 miles. H. W. Purvis, president, G. Z. Phillips, vice-president and C. A. Carpenter, secretary and treasurer, Jacksonville.

HILLSBOROUGH-INTERURBAN.—Incorporated in Florida with \$1,000,000 capital, it is said, to build a line from Tampa to Safety Harbor through Hillsborough and Pinellas counties. J. E. Winter, vice-president and treasurer, Tampa.

ILLINOIS CENTRAL.—This company has awarded a contract to the Lynch Construction Company, Monmouth, Ill., for raising the tracks at five points on the St. Louis division, totaling about five miles altogether. The work involves about 70,000 cu. yd. of material. Work has been begun on a change of line and grade between Evers, Ill., and Effingham, five miles. The grading contract has been awarded to the Lynch Construction Company, Monmouth, Ill., and involves approximately 100,000 cu. yd. of material.

LUBBOCK & GREAT NORTHERN.—Incorporated in Texas, it is said, with \$150,000 capital and headquarters at Lubbock, to build a railway between Lubbock, Tex., and Wellington, about 150 miles. The proposed line is to connect at Wellington with the Wichita Falls & Northwestern division of the Missouri, Kansas & Texas and at Lubbock with the converging lines of the Santa Fe system. The plans include the building of general shops at Lubbock. The incorporators include J. M. Elliott, S. S. Houston, and F. V. Leak.

MARLIN-TEMPLE INTERURBAN.—This company, which was organized last year, has been incorporated in Texas, it is said, with principal office at Marlin. The plans call for building an electric line between Marlin and Temple, about 35 miles. The incorporators include E. W. Moore, G. Houston, S. D. Hanna, W. Ginmuth and G. W. Glass. (December 10, 1915, p. 1113.)

MEDFORD (ORE.) LINE.—The voters of Medford have ratified a contract with the Southern Oregon Traction for the construction of a railroad from Medford, southwest along the Applegate river to the California line, 35 miles. The work involves handling a relatively small amount of material. The line is to have a maximum grade of 3 per cent and a maximum curvature of 22 deg. S. S. Bullis, Medford, Ore. (May 26, p. 1159.)

NEW JERSEY ROADS.—Residents of Penns Grove, N. J., have projected a line from Deep Water Point, near South Penns Grove, which is being developed on the south side of Penns Grove canal, east via a point near Courses Landing, Sharptown, Woodstown, Pittsgrove, Elmer, and Franklinville, to Winslow Junction, where connection can be made with the Central of New Jersey, about 45 miles. A permanent committee was organized with Judge E. C. Waddington, of Woodstown, chairman; S. H. Wright, Elmer, secretary; S. H. Stafford, Vineland, treasurer; S. P. Leeds, Atlantic City; W. McGrear, Wilmington, Del., and

Fred H. Doty, president of Penns Grove Improvement Company, Penns Grove, N. J., are interested.

NORTH CAROLINA ROADS.—The Greenleaf Johnson Lumber Company, Norfolk, Va., has given a contract to the Emporia Concrete & Construction Company, North Emporia, Va., for grading work on an extension of its logging road. The line is being extended south from Vaughan, N. C., to either Spring Hope or to Bunn. It has not yet been definitely decided to which point the line will finally be built. Ira Johnson, general manager, Norfolk.

PENNSYLVANIA LINES WEST.—A contract has been let for building double track from Columbus, Ohio, to Lewis Center, 15 miles, to the C. R. Cummins Company, Chicago, and the work is now under way.

PENNSYLVANIA RAILROAD.—The Wheeling Coal Railroad has been incorporated in West Virginia and has adopted a location for a railroad from a point on the Pennsylvania-West Virginia state line near Majorsville to a junction with the Wheeling Terminal Railway at Wheeling, in Wheeling Creek valley. The survey has been made for that part of the line in Pennsylvania, which will extend from a point on the Pennsylvania-West Virginia state line near Majorsville east to Marianna, where a connection is proposed with the Millsboro branch of the Pennsylvania Railroad. The route is along Wheeling Creek, crossing a summit near Old Concord, thence down Ten Mile Run to Marianna. Application has been made for a certificate of public convenience covering the construction of the line in Pennsylvania and after that has been granted a company will be organized and a location for the route adopted.

The Pennsylvania Railroad is contemplating reaching Petty's Island either from the north or south end, but it has not yet been determined from what point the connection will be made. Petty's Island is located in the Delaware river, between Philadelphia and Camden, and is being developed by commercial interests.

PENNSYLVANIA ROADS.—Application will be made in Pennsylvania, it is said, to build a line from Modena, Pa., northwest to Coatesville, about 5 miles. H. G. Rambo, J. V. Pennegar, and W. J. Elliott, Coatesville, are interested.

SOUTH FLORIDA & GULF.—This company, which is building a 32-mile line from Kenansville, Fla., south towards Bassenger, has track laid on 25 miles and is carrying out the work on the remaining section with day labor. The work includes putting up a station and warehouse. An extension may be built later southeast via Bassenger to Okeechobee, in all 55 miles. The company now has in operation the first 22 miles from Kenansville to Prairie Ridge and expects to develop a traffic in citrus fruit, vegetables, cattle and fish. (July 21, page 134.)

TAMPA & ST. PETERSBURG.—Incorporation has been granted to this company in Florida with \$50,000 capital and headquarters at St. Petersburg, it is said, to build from Tampa southwest to St. Petersburg, about 18 miles. The plans include building a bridge across Old Tampa Bay. G. S. Gandy, president; H. W. Fuller, vice-president, and A. L. Gandy, secretary and treasurer, all of St. Petersburg. (See Florida Roads, July 21, p. 133.)

TOXAWAY WESTERN.—Incorporated in North Carolina with \$75,000 capital, it is said, to build from Lake Toxaway, N. C., west to Sapphire, about 4 miles. J. Meltz and E. S. Meltz, Williamsport, Pa.; J. S. Adams and H. C. Jarvis, Asheville, N. C., are interested.

VIRGINIA ROADS.—Surveys are reported made for a line to be built from a connection with the Baltimore & Ohio at Winchester, Va., northwest to Gainesboro, thence southwest via Gore to Wardensville, W. Va., and Lost River valley, in Hardy county, about 35 miles. W. B. Cornwell, Romney, W. Va., president of the Lost River Lumber Company, is said to be interested.

WASHINGTON, WESTMINSTER & GETTYSBURG.—This company which was organized some time ago to build a railroad in Maryland has recently been granted an extension of time in which to carry out the work. The proposed route is through Prince Georges, Howard and Carroll counties, Maryland. Work was started in 1912 on a section of five miles north of Brentwood, Md.

WHEELING COAL RAILROAD.—See Pennsylvania Railroad.

RAILWAY STRUCTURES

BESSEMER, ALA.—The construction of a freight building at Bessemer by the Alabama Great Southern is in contemplation, but the work has not as yet been authorized.

CLEBURNE, TEX.—The Gulf, Colorado & Santa Fe is preparing preliminary plans for a two-story passenger station, 338 ft. by 80 ft. The building will have a concrete foundation and frame, terra cotta face, composition roof and concrete columns before the entrance. The station will contain the usual facilities, with a lunch room; and on the second floor there will be rooms for offices.

CLIO, S. C.—The Atlantic Coast Line has given a contract to D. J. Rose, Rocky Mount, N. C., for building a brick passenger station to be 28 ft. wide and 72 ft. long, also for building a brick freight station to be 40 ft. wide and 80 ft. long on Society street, at Clio.

COLORADO SPRINGS, COLO.—The Atchison, Topeka & Santa Fe has awarded a contract to Sharp & Fellows, Los Angeles, Cal., for the erection of a passenger station, the cost of which is estimated at about \$175,000. (May 5, p. 1017.)

DEFIANCE, OHIO.—Work is under way on the elevation of the tracks of the Baltimore & Ohio for a distance of about a mile and one-half. The project involves the laying of second track, closing the last remaining gap on the east end of the Chicago division, the construction of bridges over the Auglaize river and the W. & E. canal, the construction of subways at Jefferson, Wayne, Clinton and Summit streets, and the reconstruction of subways at Washington and Francis streets. New passenger and freight facilities are also being provided. The city is paying its share of the excess cost of the grade separation work in accordance with statutory provisions. The total cost of all improvements is estimated at \$530,000. The North American Railway Construction Company, Chicago, has the contract for the subway masonry, grading and paving; the Pittsburgh Construction Company has the contract for the false work in the river, and the Carmichael-Cryder Company, St. Louis, Mo., the contract for the bridge masonry. F. S. Harvey, resident engineer, Defiance, Ohio, is in charge of the work. (March 10, p. 464.)

DUBUQUE, IOWA.—The Illinois Central is preparing plans for a two-story brick addition to its freight house, 63 ft. by 55 ft., to cost about \$16,000.

EAST ST. LOUIS, ILL.—The Illinois Central is asking for bids on the construction of a brick freight house, 1,050 ft. by 40 ft., 400 ft. of which will have two stories. (June 9, page 1246.)

JAMESTOWN, N. Y.—The Erie Railroad is making plans for a new station to be built at Jamestown.

JOPLIN, MO.—The Missouri Pacific expects to begin work within 30 days on the construction of passenger and freight stations. The freight house will be of brick construction and the passenger station will have a stone and brick exterior with a tile roof. The cost of the work is estimated at about \$50,000.

MCCOMB, MISS.—The Illinois Central is preparing preliminary plans for a two-story office building, 100 ft. by 30 ft.

NASHUA, IOWA.—The Illinois Central is preparing plans for a frame depot on a concrete foundation to cost about \$8,500.

NEW ORLEANS, LA.—The Louisiana Railway & Navigation Company will build a passenger station at Rampart street, New Orleans. It will be 36 ft. high, 50 ft. wide and 250 ft. long of brick and concrete construction with granite front. The work will be started about September 1.

NORTH ST. LOUIS, MO.—The Terminal Railroad Association of St. Louis has acquired five city blocks of ground and intends to develop a switching yard with about 800 cars capacity, plans for which are now being made.

SECAUCUS, N. J.—The Erie is carrying out improvements on County road, Secaucus, at a cost of \$650,000. The work calls for the construction of a 36-stall roundhouse, to have 115-ft. stalls and a 100-ft. turntable, a machine shop, a power house, a storehouse and a complete engine terminal. The foundations of the buildings will be of concrete. The superstructures of the roundhouse and machine shop will be of frame construction and the power house of tile. The contract for the work has been given to the Robert Grace Contracting Company, Pittsburgh, Pa.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—A press despatch says that this company has sold the Leavenworth & Topeka, which runs from Leavenworth, Kan., to Topeka, 56 miles, to Kansas City men, who plan to make an electric interurban road of it.

ATLANTA, BIRMINGHAM & ATLANTIC.—The Commercial & Financial Chronicle publishes the following:

This company's first and refunding mortgage is dated November 1, 1915, and conveys all its property to the Equitable Trust Company of New York, as trustee, to secure an issue of \$15,000,000 of bonds, subject as to the part of said property covered by the Atlanta & Birmingham mortgage, under which \$4,090,000 bonds are outstanding. The new bonds are to be dated November 1, 1915, and become due November 1, 1945, to bear interest not to exceed 6 per cent per annum, to be subject to the approval of the railroad commission of Georgia only as follows: (1) To retire the present outstanding 5 per cent bonds of the Atlanta & Birmingham, \$4,090,000; (2) for improvements and extensions and the acquisition of additional property under proper restrictions. None of these bonds has as yet been issued.

This company's \$5,200,000 15-year 5 per cent income mortgage gold bonds, all of which are outstanding, are secured by a mortgage dated November 1, 1915, to Columbia Trust Company, trustee, subject to the first mortgage of the Atlanta & Birmingham dated January 1, 1904, and to the new first and refunding mortgage. These bonds are dated November 1, 1915, and bear interest, payable semi-annually, at not to exceed 5 per cent per annum, as may from time to time be determined by the board, but such interest shall be paid only in case there shall be net income available for that purpose, and non-cumulative.

BALANCE SHEET, APRIL 30, 1916

Assets—(Total \$40,139,611)

Road and equipment	\$37,906,360
Miscellaneous investments	24,825
Cash	1,430,534
Material and supplies	335,348
Traffic, etc., accounts receivable	245,143
Deferred assets	3,966
Unadjusted debits	111,665
Equipment under construction	81,769

Liabilities—(Total \$40,139,611)

Capital stock	\$30,000,000
First mortgage 5s, Atlanta & Birmingham	4,090,000
Fifteen-year 5 per cent income mortgage bonds	5,200,000
Traffic, etc., balances	153,701
Audited vouchers and wages	290,303
Accrued interest and taxes (4 months)	117,206
Miscellaneous	29,380
Accrued depreciation (4 months)	41,148
Reserve for retirement of receivers' obligations	122,394
Other reserves	24,628
Corporate surplus	70,850

BUFFALO, ROCHESTER & PITTSBURGH.—A semi-annual dividend of 3 per cent has been declared on the \$10,500,000 common stock, thus increasing the annual rate from 4 per cent paid since August, 1914, to 6 per cent. Previous to August, 1914, the company had been paying 6 per cent on the common. The regular 3 per cent semi-annual dividend on the preferred has been declared.

LEAVENWORTH & TOPEKA.—See Atchison, Topeka & Santa Fe.

VIRGINIAN RAILWAY.—The National City Bank, New York, is offering a block of first mortgage 5 per cent bonds, series A, of 1912-1962, of which the total authorized issue is \$75,000,000 and of which there is \$29,500,000 outstanding. The offering price is 98½, yielding 5.10 per cent interest on the investment.

WESTERN PACIFIC.—Alvin W. Krech, president of the Equitable Trust Company, New York, and chairman of the reorganization committee, has been elected chairman of the new board of directors of the Western Pacific. The new board consists of J. B. Dennis of Blair & Co., William A. Salomon of Wm. Salomon & Co. and A. M. Hunt, all of New York; C. W. Nibley of Salt Lake City; W. T. Smith, William Fries, Joseph G. Hooper, D. H. Dibblee, Warren Olney, Jr., A. R. Baldwin and Charles M. Levey, president of the company, all of San Francisco, and Harris Weinstock of Sacramento, Cal.

ANNUAL REPORT

BROOKLYN RAPID TRANSIT CO.

85 Clinton Street,
BROOKLYN, N. Y., July 26, 1916.

REPORT OF THE BOARD OF DIRECTORS TO THE STOCKHOLDERS FOR YEAR ENDING JUNE 30, 1916.

The system's passenger revenue for the year ending June 30, 1916, increased \$1,599,983.76, or 6.29 per cent. Freight revenue fell off \$132,599.92, and other operating revenues (including advertising, station privileges, rents, etc.) increased \$60,071.83, making the total operating revenue \$1,521,085.15 greater than for the preceding year.

The operating expenses increased \$733,526.44, leaving \$787,558.71 additional net revenue from operation. The operating ratio was 56.15 per cent as against 56.61 per cent for the preceding year.

In the operating expenses are included \$4,993,790.77 of charges on account of maintenance of way and structure and equipment, but this amount was not all expended, and \$531,484.34 thereof was set aside for reserves, this being an increase in reserves for depreciation over the preceding year of \$275,099.79. Trainmen's wages and other direct expenses in the operation of cars increased \$410,707.23, occasioned partly by the increase in traffic and partly by the higher scale of wages which became effective on December 31st last.

The deductions from net revenues were increased by \$574,958.53 on account of new rapid transit lines placed in operation during the year, but other interest deductions showed a slight decrease.

The final result of the system's operations was a net income of \$5,611,832.18, an increase of \$99,271.06 over the figures for the preceding year. Dividends were paid at the rate of six per cent per annum, absorbing \$4,467,318.00, and a balance remained for the year of \$1,144,514.18. When the company assumed the obligations imposed by the rapid transit contracts with the city, it was expected that during the period of construction, and before the benefits of those contracts would be felt in their effect upon net revenue, pending full operation, there would be a small margin, if any, of surplus earnings over dividend requirements. It seems likely, however, judging from the satisfactory response to such new facilities as have been placed in operation, that the company will be able safely to continue dividends at the present rate during this construction period, and thereafter the margin of surplus ought to be considerably greater.

A summary of the financial results is given in the following table:

COMPARATIVE STATEMENT OF THE RESULTS OF THE OPERATIONS OF THE BROOKLYN RAPID TRANSIT SYSTEM FOR YEARS ENDING JUNE 30, 1916 AND 1915

	1916	1915	Increase or Decrease
Gross Earnings from Operation	\$27,948,771.81	\$26,427,686.66	+\$1,521,085.15
Operating Expenses	15,693,907.81	14,960,381.37	+ 733,526.44
Net Earnings from Operation	12,254,864.00	11,467,305.29	+ 787,558.71
Income from Other Sources	438,705.88	438,715.01	— 9.13
Total Income	12,693,569.88	11,906,020.30	+ 787,549.58
Less Taxes and Fixed Charges	7,081,737.70	6,393,459.18	+ 688,278.52
Net Income	5,611,832.18	5,512,561.12	+ 99,271.06
Surplus at Beginning of Year	10,621,966.45	9,732,588.50	+ 889,377.95
Total	16,233,798.63	15,245,149.62	+ 988,649.01
Other Credits to Surplus during year	69,958.05	4,131.20	+ 65,826.85
Total	16,303,756.68	15,249,280.82	+ 1,054,475.86
Of this amount there has been appropriated:			
Accounts written off	6,330.75	12,327.56	— 5,996.81
Adjustment of Expenses prior years	8,621.97	35,088.74	— 26,466.77
Supercession and Depreciation	66,247.94	45,062.12	+ 21,185.82
Loss from operation of Employees' Restaurants	2,338.35	9,445.97	— 7,107.62
Loss from operation of Surface Cars over Manhattan Bridge .....	.....	58,071.98	— 58,071.98
Adjustment of Special Franchise Taxes 1905-1912	183,970.44	.....	+ 183,970.44
Expenses in connection with Thompson Legislative Investigation of Public Service Commission	4,850.00	.....	+ 4,850.00
Allowance to Employees in Military Service	1,425.19	.....	+ 1,425.19
Dividend on B. R. T. Co.'s Stock outstanding	4,467,318.00	4,467,318.00	.....
Total Appropriations	4,741,102.64	4,627,314.37	+ 113,788.27
Balance Sheet Surplus	\$11,562,654.04	\$10,621,966.45	+ \$940,687.59

SALE OF NOTES.

There have been sold during the year \$20,000,000 par value 5 per cent Notes, maturing July 1, 1918, and the proceeds were used to purchase

a like amount of New York Municipal Railway Corporation 5 per cent Bonds—issued to finance the equipment of Rapid Transit lines and the construction and equipment of additional tracks and extensions, as provided under the contracts of March 19, 1913, between the company and the City of New York. The notes sold were the remainder of the \$60,000,000 issue authorized in 1912 and were covered by the option then given to bankers, being disposed of on a 6 per cent basis less 1 per cent commission.

EXPENDITURES UNDER CITY CONTRACTS.

The New York Municipal Railway Corporation's expenditures for construction and equipment to June 30, 1916, under the City contracts, were as follows:

On account of contribution to City-owned lines	\$11,148,834.95
On account of equipment of City-owned lines	6,153,119.95
On account of additions, extensions, and improvements of existing railroads	23,532,620.39
Total	\$40,834,575.29

RAPID TRANSIT PROGRESS UNDER CITY CONTRACTS.

Attention was called in the last annual report to delay in construction of the new rapid transit lines to be furnished by the city in compliance with our contracts of March 19, 1913, and to the resulting consequences, both to the city and its lessee. It is gratifying to note that considerable progress has been made during the past year, and that contracts have been approved by the Public Service Commission up to June 30, 1916, for all lines to be built by the city and equipped and operated by our system, with the exception of part of the 14th Street-Eastern line, the Nassau-Broad Street line, the small section of the Flatbush Avenue line under the Long Island Railroad station, and the Queensboro Tunnel line under the East River. Approval of contracts awarded by the Commission for the tunnel sections of the 14th Street-Eastern line, however, has been deferred by the Board of Estimate and Apportionment and bids for the Queensboro Tunnel have been opened by the Commission since the close of the fiscal year.

The company on its part has either completed or has under contract practically all of the new lines and improvements which it obligated itself to construct. The conspicuous exception is the lower part of the Fulton Street elevated third-tracking which has been delayed by causes for which the company is not responsible.

The operation of the Fourth Avenue Subway, which was begun between Chambers Street, Manhattan, and 65th Street, Brooklyn, on June 22, 1915, was extended to the terminus of the line at 86th Street on January 15, 1916; operation of the Liberty Avenue elevated extension was begun on September 25; of the third track on the Fulton Street line, between East New York and Nostrand Avenue, on December 27; of the third track on the Broadway elevated line, between Myrtle Avenue and Marcy Avenue, on January 17; and of two tracks of the elevated structure on New Utrecht Avenue as far as 62nd Street, and of one track between 62nd Street and 84th Street, with connection through the new 38th Street cut into the Fourth Avenue subway, on June 24, last.

During the fiscal year 1916-17 it is expected that the following new lines will be ready for operation:

- Broadway, Manhattan, Subway (with Canal Street connection) as far north as Union Square, and possibly 34th Street.
- Jamaica Avenue elevated extension.
- Broadway elevated third track from Myrtle Avenue to East New York.
- Remainder of New Utrecht Avenue line to Coney Island.
- Third track on Myrtle Avenue between Ridgewood and Broadway.

From the city's point of view particularly, it is desirable that the Broadway subway in Manhattan should be opened for operation at the earliest possible moment. It would be doubtful policy in our judgment to begin operation on only that portion of the line which lies south of Union Square, for the resultant revenue would be small. Extended to 34th Street the operation would yield more than proportionately additional business. Yet the unwelcome situation exists that, although the sections south of 26th Street are substantially completed, the completion of the 34th Street section seems now to be at least a year distant. On account of the absence of crossovers no operation will be possible between Union Square and 34th Street until Sub-section 6 of the 34th Street section (just north of 34th Street) is finished, and the plans for the steel work for this sub-section have not yet been approved, nor has the excavation been completed. So essential to the city and the operator, and to Broadway business interests, is it that operation, when commenced, should at least include the 34th Street Station, that the delay is greatly to be regretted and no energy should be relaxed to progress the work. Otherwise the city's cost will be additionally magnified by interest charges on idle property and the joint revenue will be deprived of considerable earnings.

The results of operation of the new lines have been quite satisfactory. The railroads which have been thus far placed in operation are not those from which material additions to net revenue were expected, except as they furnish better facilities to territory previously supplied with transit, or until, in the case of the outlying lines, the tributary population should increase. None of the new lines from which a considerable net revenue was anticipated has yet been placed in operation, or will be until the latter part of the fiscal year upon which we are now entering. Instead of the entire new system being completed and ready for operation on January 1st next, as was hoped when the contracts were signed, the benefits of operation of the most profitable part of the system will not be enjoyed until about the fiscal year, 1918-19. Notwithstanding this delay it is encouraging to note that the passenger receipts of the operating company, namely, the New York Consolidated Railroad Company, have increased during the last fiscal year by \$1,333,380.07, and the net revenue has been sufficient to make good all of the company's first preferential of \$3,500,000, and \$424,467.61 additional on account of interest and sinking fund upon our investment of new capital in improvements and in contribution to City-built railroads. For the entire period of operations under the city contracts, namely, from August 4, 1913, to June 30, 1916, the net earnings have been sufficient to make good all the company's first preferential of \$3,500,000 per year, with the exception of \$14,605.41. The table given on p. 13 shows the details of these results, both for the fiscal year and for the entire period of temporary operation. Under the accounting arrangement with the city, as new property of the company is placed in operation, interest and sinking fund allowances on the cost thereof become a charge against revenue but the determination of that cost is left by the contract

to the Chief Engineer of the Public Service Commission, and inasmuch as his determinations have been delayed, the actual amounts shown as charged against revenue for interest and sinking fund are \$665,959.45, or \$480,000 more than they would have been had we computed our charges upon the costs as formally determined by him. In other words, we have anticipated his determinations so as not to be obliged to take up later any slack in such charges. Our charges under the city contracts are cumulative and are to be made good out of subsequent earnings, but nevertheless we have absorbed them, to the extent indicated, in our combined statement of system operations. The city's charges for its property placed in operation, not being earned, are added under the contracts to the city's cost of construction and should be eventually met by taxation.

As the work contemplated by the Dual System contracts approaches completion, the necessity for close co-operation between the city and the lessee becomes increasingly apparent. Representatives of the Public Service Commission have estimated that the city's costs will be greater by about \$22,000,000 than was expected, and this estimate does not include many millions for additional items to be furnished at the city's expense. Up to the present time this great municipal expenditure has not cost the taxpayers a single dollar, for it has all been capitalized (including interest thereon), and most of it has been provided for out of the issues of corporate stock. Obviously, this situation cannot, and will not, long continue. While the contracts determine the items entering into cost, it would be a doubtful policy for the city to encroach too closely upon its debt-incurring capacity, and certain of its charges, like those for deficits during temporary operation, supervision, and a considerable portion of interest during construction (the amount of which has been increased largely by failure properly to synchronize the construction of certain lines so as to expedite operation), should be provided for otherwise than out of the issue of corporate stock. It must be borne in mind that when the city made the decision, as it did about three and a half years ago, to provide transportation facilities which for several years at least would not furnish sufficient net revenue to pay the expense of operation and interest on cost at a five-cent fare and with the high standard of equipment and service exacted, the taxpayers, and not the fare-payers, would have to make up the deficits, and the sooner this situation is realized, the keener should be the desire of the people, their government, and the companies to produce the most profitable results consistent with good service. So far as our contract with the city is concerned, there is every reason to believe that the preferentials of the company will be earned when the entire system is ready for operation, and that within a reasonable number of years thereafter the city will be in receipt of full interest and sinking fund allowance upon its own investment, thereby relieving the taxpayers from burdens and realizing the financial result which both city and company should seek—namely, divisible profits. The speedy completion of new lines, and the avoidance of unnecessary burdens upon operation will expedite this desirable achievement.

RESULT OF OPERATIONS OF NEW YORK CONSOLIDATED RAILROAD COMPANY, LESSEE, UNDER THE PROVISIONS OF CONTRACT NO. 4, DATED MARCH 19, 1913, BETWEEN THE NEW YORK MUNICIPAL RAILWAY CORPORATION AND THE CITY OF NEW YORK.

	Year ending June 30, 1916	For the period August 4, 1913, to June 30, 1916
REVENUE:		
Passenger Revenue	\$9,703,384.31	\$25,727,144.39
Chartered Cars and Misc. Transp. Revenue	1,005.70	3,355.72
Advertising	82,107.44	211,923.27
Other Car and Station Privileges	54,774.70	151,056.85
Rent of Buildings and Other Property	22,670.71	76,423.49
Rent of Tracks and Terminals	26,433.23	104,099.86
Miscellaneous	13,144.07	21,063.69
Total	\$9,903,520.16	\$26,295,067.27
DEDUCTIONS:		
Rentals	\$64,867.33	\$239,346.66
Taxes	432,521.25	1,492,764.53
Operating Expenses, exclusive of Maintenance	3,998,089.07	10,455,086.09
Maintenance Fund	1,186,859.92	3,153,894.35
Depreciation Fund	296,714.98	788,473.54
Company's First Preferential	3,500,000.00	10,180,107.51
Total	\$9,479,052.55	\$26,309,672.68
Net Over First Preferential	424,467.61	*14,605.41
Company's Second Preferential as per Engineer's Determination of Cost	185,959.45	292,299.60
Reserve in respect of lines in operation—anticipating Chief Engineer's Determination of Cost	480,000.00	480,000.00
DEFICIT* IN COMPANY'S PREFERENTIALS	\$241,491.84	\$786,905.01
INTEREST† PAID BY CITY ON ITS COST OF CONSTRUCTION OF PROPERTY PLACED IN OPERATION PLUS SINKING FUND AT RATE OF 1 PER CENT PER ANNUM	604,006.18	1,318,728.11
TOTAL DEFICIT	845,498.02	2,105,633.12

*To be made good from future net income before payment of City's interest and Sinking Fund charges.

†Deficits in City's charges during temporary operation to be added to the Cost of Construction of City Owned Lines.

MISCELLANEOUS IMPROVEMENTS, RENEWALS AND REPAIRS.

Among the principal maintenance and construction expenditures during the fiscal year (other than construction expenditures on Rapid Transit Lines referred to above) are the following:

Approximately 12 miles of surface track have been completely renewed, and approximately 10½ miles additional have been overhauled, the latter work consisting of renewing defective ties, repair of joints, installation of tie rods, renewal of concrete foundations, and relaying of pavement with re-cut granite block.

We have repaved city streets to the extent of 95,452 square yards of pavement, divided as follows:

With new granite, 41,081 square yards.
With re-cut granite, 45,957 square yards.
With Medina stone, 4,958 square yards.
With wood, 3,456 square yards.

In addition the city has relaid outside of our outer rails, and at our expense, 14,852 square yards of various kinds of pavement.

On the elevated structure, 98,352 lineal feet of rail were replaced, including complete renewal of elevated tracks on the Brooklyn Bridge.

Other renewals in connection with elevated and surface tracks comprised the replacement of 138 pieces of special work; 38,788 lineal feet of timber guard rail; 31,410 lineal feet of footwalk slating, and 3,350 lineal feet of steel guard rail.

At 63rd Street Dock the slip between piers was re-dredged, 22,000 cubic yards of material being removed.

In connection with the new tracks on Stillwell Avenue leading to Coney Island, the new double track swing drawbridge over Coney Island Creek was practically completed. This consisted of an electrically operated through truss swing span approximately 250 feet long, carried on circular concrete centre pier and concrete abutments. Two submarine D. C. Cables were installed across the creek.

Repainting of the elevated structure is under way on the Lexington Avenue line from Myrtle Avenue to Throop Avenue, about 50 per cent of which was completed during the fiscal year.

A new surface railroad depot at Fresh Pond Road was nearly completed. This consists of an administration building, providing offices and general operating quarters for men, construction of concrete retaining wall and fence along the northerly property line, and installation of storage tracks with capacity for 258 cars, and a possible increase to 348 cars. This new yard will permit the abandonment of the extensive but inadequate depot facilities at Ridgewood, and the sale of that property.

Franchises were granted during the year by the city for surface railroads as follows:

On Metropolitan Avenue, from Dry Harbor Road to Jamaica Avenue.
On Fresh Pond Road, from Myrtle Avenue to Fresh Pond Terminal.

On Eighth Avenue, from 39th Street to Bay Ridge Avenue.

These call for the construction of 24,740 feet of double track overhead trolley railroad, of which that on Fresh Pond Road is in process of construction; that on Eighth Avenue has been contracted for, and that on Metropolitan Avenue is awaiting decision of the city as to grades and alignment.

Contract has been placed for the erection of a new coal handling plant at the Central Power Station.

Power Houses, Sub-Stations, Shops and Depot buildings have been improved and repaired.

Many changes in buildings have been made in compliance with orders or recommendations of the State Industrial Commission, the Health and Fire Departments, and the Public Service Commission.

Storage tracks in the rear of the Avenue N surface car yard have been extended.

Employees' club rooms and recreation facilities in various depots have been renovated and improved.

Additional equipment purchased or constructed and equipped during the year includes:

16 snow sweepers,	2 track grinders,
20 air dump cars,	2 combination tar and gravel heaters for paving work,
4 cars for transporting rails,	5 automobile trucks and
2 electric drilling machines for track work,	3 automobiles.
1 concrete mixer,	

In compliance with orders of the Public Service Commission, 34 complete and 220 partial air brake equipments have been installed on 250 double truck open passenger cars and on 4 miscellaneous cars. This leaves 128 complete and 122 partial equipments to be installed on this class of cars during 1916 and 1917 to complete the equipping of all cars with air brakes as required by the Commission.

Two hundred and three geared hand brakes have been installed on surface passenger and miscellaneous cars.

An experiment was made in the construction of one articulated car unit, made by joining two single truck closed cars.

One hundred and eighty-nine passenger cars were equipped with life guard chains.

Upward of 2,000 cars were overhauled, repaired and repainted.

Important changes were undertaken during the year at the Williamsburg Power Station. Contract was entered into with the Westinghouse Company for one 30,000 K. W. Turbo Unit and Condenser outfit, this to replace one of 7,500 K. W. and increasing the capacity of the station to 112,500 K. W. Order was placed for 30 Taylor stokers and 22 turbine driven blowers for furnishing forced draft for the stokers; the installation of the first six stokers is under way, and two of the blower equipments have been installed. Four air ducts have been installed to deliver forced draft to the Taylor stokers. Contract is about to be entered into for rebuilding the coal and ash downtakes made necessary on account of the installation of new stokers. The rebuilding of the auxiliary steam piping in the boiler room was begun, substituting cast steel valves and fittings for cast iron valves and fittings, made necessary on account of increase in the working steam pressure and substituting superheated steam for saturated steam. Alterations to the original steam main, and the installation of additional pipe to form a Ring Main Steam Header with remote controlled electrically operated emergency valve to isolate sections of the header in case of trouble were contracted for. A new dividing box has been installed to accomplish a more satisfactory division of boiler feed water among the three feed water heaters; with this dividing box a control valve has been installed to automatically maintain a common water level in the three feed water heaters. A storage tank and pump has been installed for consuming boiler feed water in place of city water to seal the glands on the main turbines; this will result in a substantial saving in water. A system has been installed for the purpose of obtaining a more satisfactory control of the compound used in treating the boiler feed water. There was installed in the flues of this station a cinder catcher for 18 boilers, located on the first floor, making a complete installation for the first floor boilers. Material has been purchased for the installation of cinder catchers for 24 boilers on the second floor; in connection with this, three flues have been enlarged and the internal mechanism is about to be installed.

The Hudson Sub-station has been enlarged to provide facilities for furnishing power for the operation of signals in the Broadway-Fourth Avenue Subway; also the switching equipment has been re-arranged to provide for handling the additional power required for the operation of the Broadway-Fourth Avenue Subway.

During the past fiscal year there was removed from the system 8.48 miles of overhead D. C. Feeders; of this amount 6.57 miles was re-installed in other parts of the system where required. A total of 18.72 miles of underground feeders was removed, and 2.78 miles re-installed elsewhere. 107.35 miles of trolley wire were renewed.

There were 392 trolley poles installed; 482 trolley poles removed; 380 trolley poles reset; 274 trolley poles re-inforced, and 2,300 trolley poles repainted.

Seven hundred and seventy feet of conduit line were constructed on South Sixth Street and Berry Street. On the Brooklyn Bridge, 9,221 feet of 1,000,000 C. M. power cables were installed.

EMPLOYEES' WELFARE WORK.

The companies of the system expended during the year for welfare work among its employees, and for pensions of men retired from service, \$112,840.57. Of this total \$17,703.31 was on account of the system's medical bureau; \$35,818.07 on account of pensions; \$23,920.78 (covering only a portion of the year) for contributions to employees' insurance premium, and the remainder for club house expenses, contributions to baseball league, entertainments, etc.

On January 1, 1916, appeared the first issue of the B. R. T. Monthly, a publication devoted to the interests of the railroad system and its employees.

The Employees' Benefit Association since its inception has paid out \$346,543.00 in sick benefits, and \$149,999.26 in the case of deaths of members, and its invested funds and cash resources at June 30, 1916, amounted to \$49,388.10.

Among the special activities during the year were the following:

Insurance of Lives of Employees.

A substantial addition was made during the year to the welfare interests of the company in the shape of a group insurance plan under which, on June 30, 1916, 5,749 employees were insured for \$1,000 each, including 33 employees who have taken out additional insurance in amounts varying from \$1,000 to \$4,000.

This plan became effective on September 15, 1915, a group contract being entered into between the Brooklyn Rapid Transit Company and the Travelers Insurance Company of Hartford, Conn. The insurance was offered to all employees of the B. R. T. System in service two years or more and a sufficient group responded to secure the insurance in policies of \$1,000 without medical examination. Of the 8,000 employees eligible for this insurance, 6,300 took out policies under the B. R. T. plan; 46 death claims have been paid by the Travelers.

The insurance is written on a term basis which secures a very low premium. For employees within the group whose yearly wages do not exceed \$3,000, the Brooklyn Rapid Transit Company pays one-half the premium on policies of \$1,000, thereby reducing the actual premium paid by the insured employee to a rate lower than that at which similar insurance has ever been obtainable before. For example, employees between the ages of 32 and 40 pay a fraction over eight cents a week; employees 50 years of age pay a fraction over 23 cents a week for \$1,000 of insurance.

In addition, the Brooklyn Rapid Transit Company has announced its intention to assume the entire premium on \$1,000 of insurance in the case of insured employees retiring pursuant to the Pension Regulations of the system, and in certain other cases calling for special consideration. This has the effect of obtaining the equivalent of paid-up insurance upon retirement at a premium rate which could not purchase one-quarter of the amount of insurance under any individual policy obtainable.

Other important features of the plan protect the insured in the event of leaving service and in the event of total disability.

The Brooklyn Rapid Transit Company will pay approximately \$31,000 in the first year of the insurance contract toward the premiums of employees insured thereunder.

The popularity of the group insurance plan resulted in a material increase in the membership of the Employees Benefit Association, inasmuch as membership in that association was made a necessary condition of taking out the insurance. The membership of the Employees Benefit Association increased from 8,912 in June, 1915, to 10,516 in June, 1916; of this increase 1,300 members were brought into the Association directly as the result of their desire to take the group insurance.

Medical Inspection Bureau.

The Medical Inspection Bureau during the past year has completed the task of co-ordinating all of the medical service supplied to employees of the company, which includes:

(a) Physical examination of all candidates for employment in the Transportation Department.

(b) Compulsory Medical Inspection and free medical attendance to all Transportation Department employees, about 10,000 in number.

(c) Free medical attendance for members of the Employees Benefit Association outside of the Transportation Department.

(d) Medical attendance for all employees in whatever department engaged who may be injured in the course of their duties.

(e) The instruction of certain employees in First Aid and supervision of First Aid service rendered by such employees to fellow employees who may be injured.

(f) Periodical re-examination of all motormen.

A staff of six physicians is employed continuously in this work, the scope of which is constantly increasing as the operations of the company expand and as opportunities are afforded for the development of health education.

The number of First Aid cases in use has been increased substantially during the year so that there are now eighty-five of these cases in service and upward of 200 employees qualified by special instruction to administer first aid.

All such employees are re-instructed in first aid twice each year. Lung-motors have been installed to supplement the Schaeffer or prone pressure method of artificial respiration for cases of electric shock.

A system of reports covering both sickness and accident cases has been established which insures not only the prompt treatment of employees injured or sick, but valuable personal records which are essential in dealing with the general problems of hygiene and sanitation involved in providing medical care for so large a body of men.

Safety Campaign.

Through the Central Safety Committee and the various Departmental Safety Committees the attention of all the employees of the system has been continuously directed to the vital importance of safety in the operations of the system. The mechanical safeguarding of dangerous machinery and dangerous places and installation of warning signs at points of particular hazard throughout the system was the beginning of systematic safety work.

Meetings of the employees' committees, receipt and discussion of safety suggestions from employees, the special studies by these committees both of accidents which have actually occurred and of the conditions productive of accidents, the frequent distribution of bulletins dealing with safety—

these are some of the measures which have been adopted in the larger and permanent problem of educating the employees themselves.

Classifications for accident statistics more comprehensive and illuminating than those formerly in use have been adopted during the past year in the several departments which have a serious accident hazard.

It is unwise to attempt to draw general conclusions as to results from the comparative statistics of a few years only, but it is at least encouraging to note that charts which have been prepared show the number of car collisions, persons struck and car and vehicle collisions per 10,000 car miles operated and the number of boarding and alighting accidents per 100,000 passengers carried, indicate a downward tendency in the case of persons struck and boarding and alighting accidents.

In the matter of car and vehicle collisions and car collisions, despite an unusually severe winter which greatly increased the hazard of these accidents by producing slippery rails and bringing all classes of vehicular traffic on the car tracks, the charts indicate that the system has at least held its own with the best results of previous years in many of which weather conditions were substantially more favorable to safe operation than they were through the winter of 1915-1916.

The public safety campaign which the company conducts in co-operation with the Brooklyn Institute for Safety and under the approval of the Board of Education of the City of New York, has continued successfully during the year. Forty-three new Safety Patrols have been formed among the boys in the Brooklyn schools with over 1,000 members, and 36 new Careful Clubs among the girls with over 700 members. Taking into account, Safety Patrols and Careful Clubs formed in previous years, it appears that nearly 2,000 boys and more than 1,000 girls in the Brooklyn schools have during the past year been enrolled in these organizations.

As in previous years, stereopticon and moving picture lectures played an important part in the school instruction, safety calendars were provided for every schoolroom in Brooklyn, more than 9,000 in number, and 88 public schools and 29 parochial schools participated in the prize essay contests on safety subjects.

Safety instruction was given in 62 vacation schools and playgrounds during the summer of 1915, and provision has been made for similar instruction during the present summer. Safety meetings have been held for adults in many of the congested districts of Brooklyn in co-operation with public authorities and civic organizations.

The attitude of the public authorities toward this work is one of its most encouraging results. Officers of the Board of Education have recently expressed the conviction of that organization that safety instruction must continue as a permanent feature of public school education. The Police Department of the City, through the extension of traffic regulation in the interest of safety and through the establishment of additional play streets, has co-operated in an important way—even in some instances to the extent of sending uniformed precinct officers into the schools to talk safety to the older boys.

The Health Department, Fire Department and many other branches of the City government have been equally helpful.

It may be concluded, therefore, that the public safety work which was undertaken experimentally in 1913 has made a definite place for itself in the community in which the company operates.

FIRE INSURANCE.

The fire losses during the year aggregated \$5,167.63, of which \$3,701.19 was paid by the stock companies with which insurance is taken, and the balance out of the earnings of the Insurance Reserve Fund. The companies of the system continue to contribute to the Reserve Fund upon premiums fixed by the trustees, and re-insurance with stock companies was continued during the year by the trustees in the amount of \$25,638,895. The Insurance Reserve Fund amounted, on June 30, 1916, to \$890,526.35, of which \$839,098.08 is invested in stable securities.

RESERVE ACCOUNTS.

There has been added to Reserves during the year the following:

Insurance	\$103,086.88
Amortization of Capital, etc.....	548,498.89
Employer's Liability	23,364.09

\$674,949.86

but retired property adjustments chargeable to these

Reserves aggregating

also payments account of Employer's Liability....

have reduced the year's Gain in Reserves to.....

INCREASE IN NUMBER OF STOCKHOLDERS.

There has been an addition to the number of stockholders during the year of 205—total number at June 7, 1916, being 9,038 against 8,833 a year ago.

TAXES.

During the last year of Mayor Gaynor's administration the company's representatives agreed with the Law Departments of the State and City, and with the City Comptroller, upon a settlement of special franchise assessments covering the years from 1907 to 1912 inclusive, with the exception of 1909, where the assessment had previously been compromised. Mayor Gaynor's unexpected death prevented his approving the settlement. His successor, Acting Mayor Kline, took no action thereon during the few months that he occupied the office, and the matter was not finally disposed of by Mayor Mitchell until March of the present year. The assessments in litigation covered by the settlement aggregated \$191,672,200, on which the original tax was \$3,363,427.57. The amount of reductions in valuation procured was \$44,982,679, and after paying nearly \$400,000 in interest and penalties the saving effected in taxes was \$372,670.28. This would have been materially increased had the terms of settlement been more promptly acted upon by the Mayor. The compromise eliminates practically all of the system's liability for taxes prior to the current year—the outstanding assessments being for small amounts where the company has been successful thus far in its litigation, and the special franchise valuation of the Nassau Electric Railroad Company for 1907, most of which has been paid, but a determination of which the city refused to include in its general settlement on account of possible joint liability of the Long Island Railroad Company.

In common with other owners of property the companies of your system have been compelled to pay their share of higher taxes levied for the support of city, state and federal governments. With this we do not find fault, except as tax burdens are inequitably imposed, and except as public officials still find it easy to select public service corporations as the most

fruitful victims for new tax impositions, forgetful that these exactions impair and limit the ability of such corporations to furnish the best facilities, and notwithstanding the fact that, unlike most other producers, transportation companies cannot shift the burden of taxation by increasing the price of their product to consumers. For seventeen years, ever since Governor Roosevelt succeeded in getting the legislature to pass the special franchise tax law, and upon his recommendation as a measure of equity, payments otherwise made by corporations for the enjoyment of franchises have been properly credited upon the taxes assessed for the privilege of occupying public streets and places. During the recent session of the legislature, however, and at the instigation of city officials, this equitable rule was changed so far as concerns the payments of compensation to the city for carrying passengers over the East River Bridges, and such payments can hereafter no longer be so credited. At the same time the State Tax Commission, which fixes the value of special franchises, has eliminated the bridge franchises from assessment, and has increased our other franchise assessments by about \$6,000,000 for the year 1916. The result is a two-fold additional burden—namely, not only the increased amount of direct taxes but the addition of about \$230,000 a year for the privilege of carrying passengers across the bridges at greater expense and without materially additional revenue. The companies are therefore obliged to face the question whether they will continue such operation, except where it may be required by our rapid transit contracts with the city. In the case of the surface car operation on the Williamsburg Bridge, the Bridge Commissioner has, fortunately for our solution of this question, terminated the contracts with all the surface railroad companies whose cars cross this bridge, and they are continuing operation at the request of the city under temporary permits, the city beginning to realize that there is something more involved in car operation than collection of revenue for the city treasury. Unless therefore some equitable arrangement can be made with the city under which the bridge service can be placed upon a satisfactory basis, both from the point of view of the operator and of its patrons, the present facilities are likely to be seriously curtailed.

The present situation is not new; its tendency and the effects were emphatically alluded to by President E. W. Winter in his report for the year 1908 in which he said:

"The trackage over the two East River Bridges now in service, while constituting a part of the operating routes of the many lines converging at the Brooklyn termini, is distinguished from the rest of the system by inherent conditions both troublesome and costly to deal with, but from the operation of which no adequate revenue return is derived. The relative importance of this distinctly peculiar feature of your company's situation increases with the opening of new bridges and growth of traffic between Brooklyn and Manhattan. Over 12 per cent of the 73,674,770 total car miles during the last fiscal year, or about 9,000,000 car miles were made on the two bridges. This very considerable part of the total car movement was through a traffic desert, save the comparatively small receipts in half fares from passengers riding between bridge ends. In other words, the Brooklyn system after running its cars to the boundary of its traffic territory adds an average of about 12 per cent actual service at greatly increased relative cost without extra charge to the passenger.

"During the fiscal years 1900 to 1907, inclusive, after crediting the

account with all revenue from local bridge traffic the Brooklyn system has paid out nearly \$5,000,000 for charges attaching exclusively to bridge maintenance and operation. No charge applying generally to the system as a whole nor of more than \$700,000 paid for various fixtures supplied to the bridges to aid in the handling of that business is taken into this account."

Our taxes for the past fiscal year aggregated \$1,837,682, a sum equal to about 15 per cent of income from operation—before deducting from such income any interest, rents, taxes or other fixed charges.

BROOKLYN RAPID TRANSIT REFUNDING MORTGAGE FOUR PER CENT. BONDS.

Authenticated to July 1, 1915..... \$55,061,000.00
Authenticated during year..... 644,000.00

\$55,705,000.00

Converted into stock..... 29,619,000.00

Net Authenticated and Outstanding..... \$26,086,000.00

In hands of the Public..... \$3,459,000.00

In possession of the B. R. T. System..... \$22,627,000.00

As follows:

*Collateral to \$60,000,000.00 6 yr. 5 per cent.

Notes \$10,000,000.00

Collateral to Bills Payable..... 3,775,000.00

In Treasury B. R. T..... 6,841,000.00

In Treasury N. E. R. R..... 1,046,000.00

Deposited with City of New York by The

N. E. R. R. Co..... 15,000.00

Deposited with Trustee of The Nassau Electric

Railroad Consolidated Mortgage..... 700,000.00

Guaranty Fund Brooklyn City Railroad Lease... 250,000.00

\$22,627,000.00

*\$2,265,000 par value of these notes have been converted into New York Municipal Railway Corporation's five per cent. first mortgage bonds, as permitted, prior to January 1, 1916, by the terms of the trust agreement.

Respectfully submitted by order of the Board of Directors.

T. S. WILLIAMS,
President.